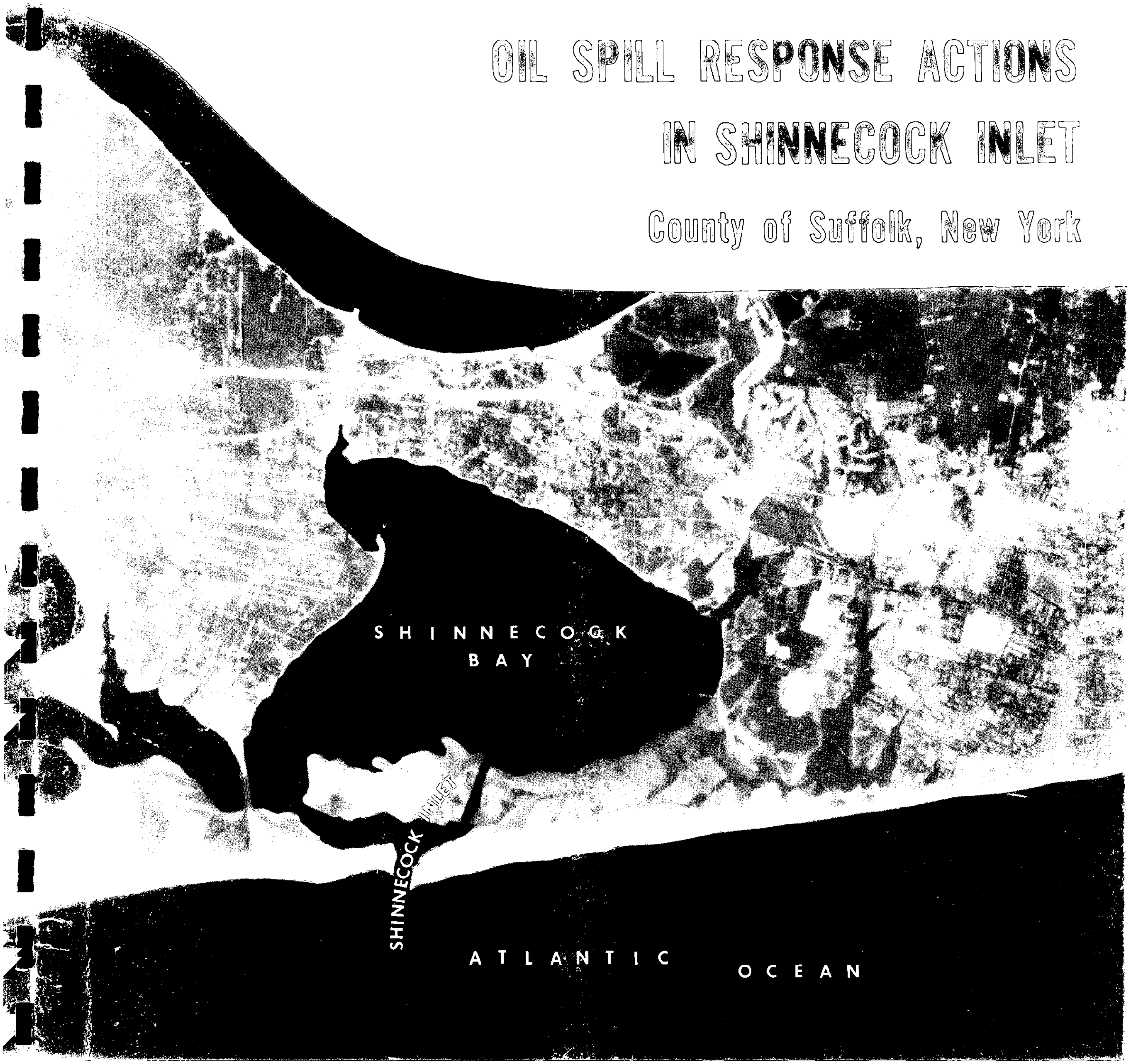
OIL SPILL RESPONSE ACTIONS IN SHINNECOCK INLET

County of Suffolk, New York



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OIL SPILL RESPONSE ACTIONS IN SHINNECOCK INLET (NY)

NY-L81

LONG ISLAND REGIONAL PLANNING BOARD

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COUNTY OF SUFFOLK, NEW YORK

Prepared by

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SECTION I INTRODUCTION

1.1 STUDY OVERVIEW

The Long Island Regional Planning Board (LIRPB) with funds provided by the N.Y.S. Department of State under the Coastal Energy Impact Program, and with the assistance of the Regional Marine Resources Council and State and local governmental entities, initiated a three phase program in 1978 to develop options for the protection of all Long Island south shore bay environments from oil spills originating either from Atlantic Outer Continental Shelf (OCS) oil production activities or the tanker transport of petroleum products in the New York Bight. There are five shallow tidal inlets along the Island's south shore that link the bay environments with the Atlantic Ocean: Shinnecock, Moriches, Fire Island, Jones and East Rockaway Inlets. Under Phase I, the LIRPB prepared a report that contained recommended response actions for the containment and cleanup of oil spills impacting the Fire Island Inlet region (Long Island Regional Planning Board, 1979). The subject report, Oil Spill Response Actions in Shinnecock Inlet, has been prepared under Phase II; this phase also includes the preparation of a companion report for the Jones Inlet region. Completion of Phase III is expected by the end of 1981; spill control plans for both Moriches and East Rockaway Inlets will be prepared during this phase. All of the response plans prepared under this effort provide detailed site specific information for use by the U.S. Government On-Scene Coordinator in responding to significant oil spill events.

The program addresses the need as identified in the N.Y.S. Department of Environmental Conservation report, New York State and Outer Continental Shelf Development - An Assessment of Impacts, for the development of adequate oil spill cleanup capability. Oil spills - either from OCS activities or the tanker transport or petroleum - will continue to occur in the future in or near New York's coastal zone.* Coastal areas are fortunate if oil spill trajectories are offshore. However, onshore trajectories from spills originating offshore, and nearshore spills, regardless of their trajectories, pose crises requiring a rapid response if meaningful attempts are to be made to safeguard valuable marine resources found in shallow bays.** Experience has shown that should a major oil spill off the south coast of Long Island occur tomorrow, it would be impossible to clean up the largest portion of the spill. This oil would threaten the south shore beaches and bays. While little could be done to prevent the fouling of the beaches, certain response actions, as identified in this report, can be implemented to contain/collect oil near the ocean inlets before it fouls widespread portions of the productive habitats found in the barrier beach lagoons.

Oil spill contingency plans usually take the form of chain-of-command lists that identify responsibility for spill cleanup, and contain the addresses of potential contractors who have spill cleanup equipment. The state-of-the art of such plans has been improved through the development of detailed, feasible oil spill cleanup strategies for the Shinnecock Inlet region. The strategies contain information on how and where available oil spill containment/

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*The worst oil spill in Long Island waters since authorities began keeping records of such incidents in 1972, occurred on 11 January 1978, when the tank barge Bouchard 100 spilled 210,000 gallons of heating oil into Long Island Sound waters near Eatons Neck.

**On 23 February 1981, the Coast Guard informed the LIRPB that a barge containing 2.7 million gallons of #6 oil was adrift in heavy seas eight miles south of Shinnecock Inlet. The barge broke from tow and there were no people aboard the vessel. The wind direction in the afternoon was from the southeast, and it was expected to shift to the southwest during the course of a storm predicted for the evening of 23 February. Coast Guard vessels were on the scene, and an attempt was being scheduled to reconnect the tow rope apparatus. Fortunately, the barge was reconnected during the early morning hours of 24 February and there was no spillage of oil. There are probably many events of this nature occurring that do not result in actual spills. However, the events continue to pose the potential of major oil spills along the south shore of Long Island that could seriously impact not only the ocean shoreline, but bay shorelines as well.

cleanup equipment can be most effectively deployed in an initial response effort.

The potential oil spill problem and its relationship to the south shore bays has been documented in N.Y.S. Department of Environmental Conservation (1977), Long Island Regional Planning Board (1979), Hardy, Baylor, Moskowitz and Robbins (1975), and Stewart and Devanney (1974). These reports contain information on the susceptibility of Long Island's south shore to oil spills, as well as the environmental and economic consequences associated with such spills. Suffice it to say that an oil spill entering the south shore bays could have a devastating effect on estuarine habitats that support extensive commercial and recreational fisheries and waterfowl populations. These bays are also used extensively for recreational boating and water-related recreational activities.

1.2 TECHNICAL CONSULTANTS

The conduct of this study required the services of consultants having expertise in:

1. oil spill containment and cleanup technology, and;
2. hydrodynamic modeling.

Woodward-Clyde Consultants of San Francisco, CA and Tetra Tech, Inc., of Pasadena, CA were retained by the LIRPB for these services. The process employed by the LIRPB in selecting consultants is reviewed in Long Island Regional Planning Board (1979) and other documentation prepared under Contract D142688 for the Fire Island Inlet spill response study.

1.3 REVIEW COMMENTS

Review comments on all phases of the work performed in the development of this spill control plan for Shinnecock Inlet were solicited by the LIRPB staff. Meetings with local government personnel and the Regional Marine Resources Council were utilized to monitor consultant performance and discuss the technical aspects of oil spill control. A draft of the response plan was distributed to members of the Council and selected Federal, State and local agency officials with responsibilities involving oil spill control and/or environmental protection, and a request for comments was made. Appendix A contains a digest of the formal comments submitted by those responding to this request, as well as responses by the staff and its consultants to the issues/points raised. This digest is an integral part of this report, as it contains information pertaining to the implementation of recommended strategies detailed in Section 5.

1.4 BACKGROUND INFORMATION

Part of this study was devoted to the preparation of inventory information on subjects germane to the cleanup and disposal of oily waste. Appendix B contains an inventory of oil spill equipment available in the Long Island region. This appendix is in three parts:

1. equipment owned by spill contractors and spill cooperatives;
2. equipment owned by Federal, State and local agencies; and
3. equipment owned by members of the Long Island Oil Terminal Association (LIOTA) under cooperative clean up agreement.

Appendix C consists of an up-to-date listing of facilities that are capable of processing oily waste, as well as a listing of approved waste oil collectors located in the New York Metropolitan Region. Preparation of this appendix was necessary because of the problems associated with finding a location for the disposal of oil contaminated materials resulting from spill cleanup.

Information on dispersants, their application techniques and environmental effects is contained in Appendix D. Appendix E deals with sorbent barrier construction for use at the entrances to mosquito ditches and other low current areas.

SECTION 2 OIL SPILL SCENARIO

The primary objective of this study is the development of recommended initial response actions to prevent or minimize oil pollution in Shinnecock and adjoining bays that might result from oil spills impacting the Shinnecock Inlet region. In order to develop initial response plans it was necessary for the LIRPB staff to define an oil spill scenario that would relect various factors influencing the selection of response actions. The scenario described below represents a "worst case" situation; it is based on the characteristics of petroleum transport activities in the New York Metropolitan Region.

2.1 OFFSHORE SPILL SCENARIO

The Port of New York and New Jersey is one of the major ports of the world. In 1975 ship arrivals at the Port were estimated at over 10,000 vessels. Seventy one percent of the total waterborne commerce - 127 million short tons - consisted of shipments of petroleum products and crude oil to terminals in the Port of New York and New Jersey for refining. Even if pipelines are used to transport crude oil that may be produced from Atlantic Outer Continental Shelf areas, "there is still a substantial danger of spills from tankers that presently travel nearly parallel to Long Island" in the Nantucket/Ambrose traffic lanes south of Long Island (N.Y.S. Department of Environmental Conservation, 1977, p. 67).

Approximately one-third of the 2,400 trips of all tankers between the 20,000 and 70,000 DWT range entering the Port in a given year travel the Nantucket/Ambrose traffic lanes. Tanker traffic in these lanes could increase up to 19% (150 additional trips), if all the potential oil produced from the Georges Bank were tankered to the Port and foreign oil imports were not displaced. The additional tanker traffic would increase the risk of oil spills.

Tankers up to 85,000 DWT utilize the Nantucket/Ambrose lanes to transport oil to the Port of New York and New Jersey. However, vessels of this size and others in excess of 40,000 DWT must lighter their cargo at sea.

The following scenario developed by the staff for the preparation of a spill response plan at Jones Inlet reflects petroleum transport activities in the northern section of the New York Bight.

> *The loss of an 85,000 DWT tanker carrying crude oil south of Long Island at the approximate location, 40°31'N, 72°29'W; during summer weather conditions that ate conducive to the northerly transport of spilled oil. Oil from this spill event is assumed to strand along the south shore of Westhampton/Tiana Beach and Hampton Beach and also enter Shinnecock Inlet.*

The spill site is located directly south of Shinnecock Inlet in the separation zone between the Nantucket/Ambrose traffic lanes. The oil spill technology consultant was instructed to amplify this scenario through the provision of sufficient detail that would be required in the formulation of spill control strategies.

2.2 LIKELIHOOD OF SPILL EVENT AS DESCRIBED IN THE SCENARIO

The oil spill event described above is based on characteristics of petroleum transport in the New York Bight. While both small and large spills associated with tanker casualties are not uncommon events when viewed on a global scale, it is not possible to make accurate predictions of spill events, and the probabilities associated with them on local time and space scales. In general terms, smaller spills are more probable than larger spills, but again, quantification of the likelihood of such spills was not attempted in this report. Such a computation would also be complicated by adding dimensions of spill location and timing, both of which would act to decrease the likelihood of the scenario event.

What can be said is that the specific spill event as described in the scenario is highly unlikely. For the purposes of oil spill planning, it was necessary to relate response actions to an event whose occurrence is possible in the region, and has the potential of causing major environmental disruption.

SECTION 3 CONCLUSIONS AND RECOMMENDATIONS

As shown in this study, more than ample time is available to implement the predetermined spill response actions. Conventional booming and skimming techniques should be effective in limiting contamination into Shinnecock Bay. However, due to the presence of shallow water and fast currents within Shinnecock Bay (3.0 knots in Shinnecock Inlet, 1.8 knots in southern Shinnecock Bay, and 1.8 knots under Pongquogue Bridge--all current speeds at maximum flood tide), it is likely that conventional booming and skimming techniques will be only partially effective and large shoreline areas along Shinnecock Bay would become contaminated. Conventional response actions would definitely be ineffective in the inlet itself because of the fast currents - greater than 3.0 knots (Vanderkooy et al., 1976). Oil has to move through Shinnecock Inlet and into more quiescent waters before it can be contained, and even then, currents of up to 1.8 knots can make response actions difficult to implement and limit their effectiveness.

A more than adequate amount of oil spill equipment is available in the Long Island area to respond to a spill off Shinnecock Inlet. Upon request of the U.S. Government On-Scene Coordinator, optimax booms, self-propelled skimmers, boats, and other equipment could be provided by Clean Harbors Co-operative, and by spill contractors, such as Marine Pollution Control. Oil spill equipment is also available from members of LIOTA.

Due to the 81 hour period from the time of the accident to the arrival of the slick, all response actions could be implemented prior to impact. This is true for both responses carried out by spill contractors and by local groups. For a spill under the conditions set forth in this scenario, it would be unnecessary to have equipment at Ponquogue Marina (or anywhere around Shinnecock Inlet) to make it more readily accessible. However, it is advisable to construct permanent anchor points at all shoreline boom termination points shown in Figure 9. These provide stable anchoring points for booms with high tensile forces placed on them (i.e., diversion booms).

Since conventional booming and skimming techniques are incapable of preventing oil from contaminationg Shinnecock Bay or reducing shoreline contamination of the beaches adjacent to Shinnecock Inlet, the use of chemical dispersants to treat the slick in offshore waters may be necessary to protect these beaches and Shinnecock Bay from contamination. For these dispersants to be effective, the oil in question has to be amenable to dispersand treatment. Since dispersed oil mixes in the water column, the possibility would still exist for some oil to reach the beaches or be carried through the inlet by subsurface currents. These subsurface currents are slower than surface currents because they are relatively uninfluenced by winds, and tend to move along shore toward the west. An immediate decision would have to be made if dispersants are to be used because anywhere from 24 to 36 hours are required to implement a dispersant spraying system. Steps should be taken to assemble dispersant application equipment and personnel immediately in the event of a major spill. The decisionmaking process leading to use of this alternative should also be initiated immediately.

The construction of a berm at midtide line on the barrier island beaches would limit contamination and make cleanup easier.

SECTION 4 HYDROGRAPHIC CONDITIONS AT SHINNECOCK INLET

The operational efficiency of oil spill containment equipment is limited by current velocity. This section presents a review of data compiled and collected by Tetra Tech, Inc. for the Shinnecock Inlet region. It was determined that computer modeling would be required to simulate tidal current conditions at/near Shinnecock Inlet because of the lack of tidal current measurements in this area. Representative tidal current velocity plots are included; they provide a basis for assessing the feasibility of containment/cleanup operations in different areas.

4.1 HYDROGRAPHIC SETTING

Shinnecock Inlet connects the Atlantic Ocean with Shinnecock Bay, which is a shallow estuary approximately 15 square miles in area on the south shore of Long Island. Figure 1 shows the location of the study area. Shinnecock Bay is connected on the west to Moriches Bay via the Quogue and Quantuck Canals, and on the north to Great Peconic Bay through the Shinnecock Canal. Depths range from one to 11 ft. with an average mean-low-depth of about 5 ft. within Shinnecock Bay. In addition, isolated depressions over 20 ft. deep have been reported. The average tidal exchange is 800 million cubic feet of water, most of which passes through the inlet; water exchange with Moriches Bay and Great Peconic Bay is minor.

The tides in Shinnecock Bay are semi-diurnal with a period of 12.42 hours. Mean tidal range in the Atlantic Ocean south of Shinnecock Inlet is about 2.9 ft.; spring and neap ranges are 3.5 ft. and 2.1 ft., respectively. The times of high and low water are different at opposite ends of the bay resulting in a net westward tidal flow through the Quantuck and Quogue Canals from the bay and a small net southerly flow through the Shinnecock Canal into the bay. The maximum observed ocean storm tide at Shinnecock Inlet is 10.4 ft. above mean sea level as recorded during the 31 August 1954 hurricane (Tetra Tech, Inc., 1980a).

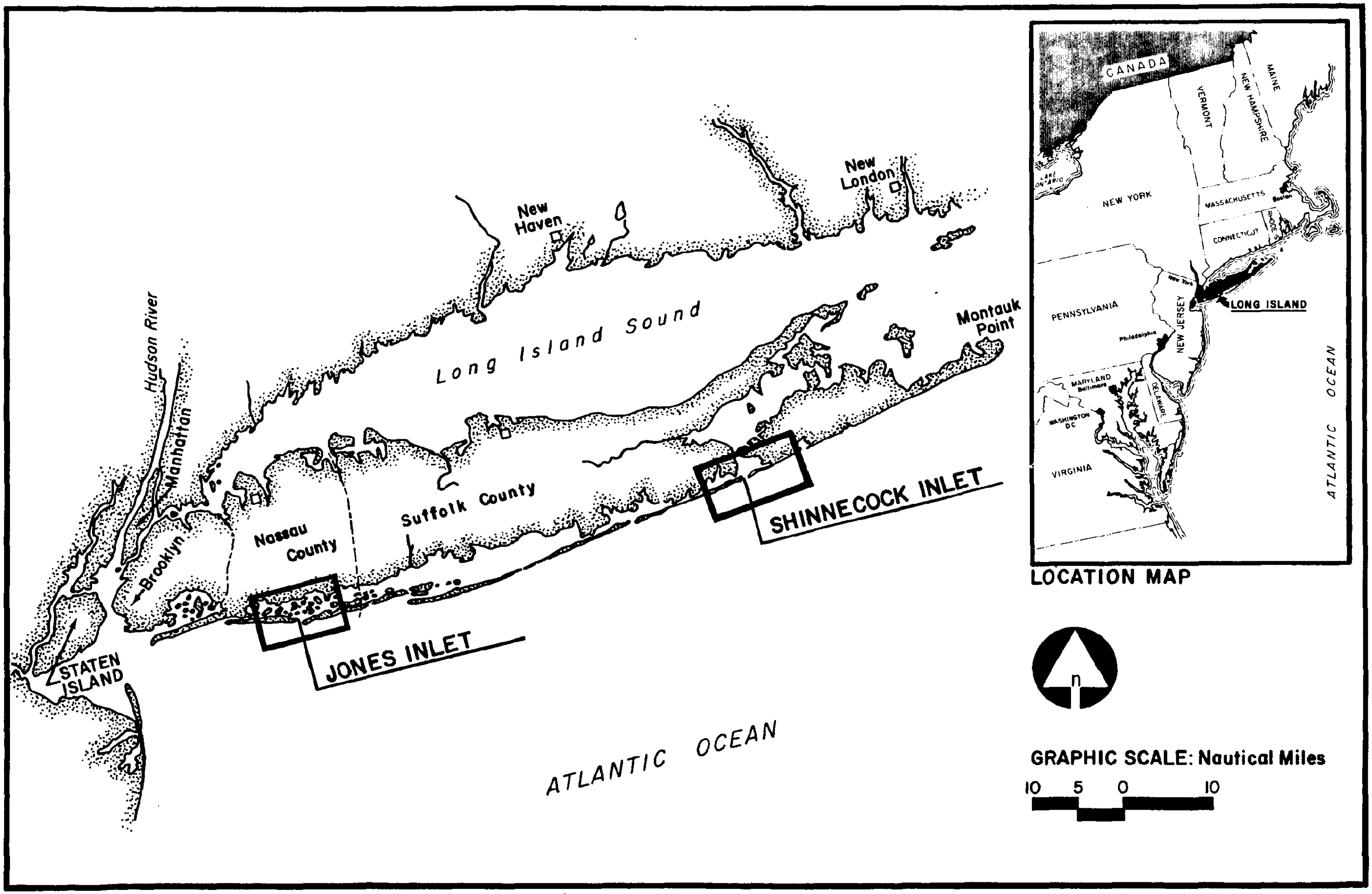

FIGURE 1 LOCATION OF JONES AND SHINNECOCK INLET STUDY AREAS

Tidal action is the major agent responsible for current velocities and directions in Shinnecock Inlet and associated water bodies; therefore, velocities vary with the tidal stage and directions reverse approximately every 6.2 hours. Average maximum current velocities in the inlet of 2.5 and 2.3 knots on flood and ebb tides, respectively, are reported in NOAA current tables. Maximum velocities during flood and ebb tides were 2.3 and 4.0 knots, respectively, as measured by the Army Corps of Engineers. No data were available on current characteristics within the interior channels of Shinnecock Bay.

4.2 HYDROGRAPHIC SURVEY OF SHINNECOCK INLET

The LIRPB contracted with Tetra Tech, Inc. to conduct a detailed analysis of tidal and wind induced currents in the vicinity of Shinnecock Inlet to enable the development of oil spill containment/cleanup strategies. The objective of the study was to define current magnitudes and directions in the mouth of Shinnecock Inlet and Bay under varying tide and wind conditions. Methods include tidal current measurements and applications for circulation models.

Current observations in Shinnecock Inlet were conducted on 24 and 26 September 1980 under spring tidal conditions. Twenty-seven sampling stations were located in important passageways for flow among the various shoals and islands. Measurements were taken during portions of flood and ebb tides, and are presented in Tetra Tech, Inc. (1980b).

A two-dimensional depth-averaged model coupled with a finite element model was used to simulate current magnitudes and directions, and tidal rise and phase throughout Shinnecock Bay and Inlet. The following five scenarios were simulated:

a. spring tide conditions of 26 September 1980 (current measurements were made in the field on this date);

b. neap tide conditions - no wind;

c. typical summer winds (5 meters/sec. from SSW) - no tide

d. typical winter winds (6 meters/sec. from WNW) - no tide;

e. typical northeast storm conditions. (Wind characteristics of the blizzard of 6-8 February 1978 were utilized.)

Computer plots showing the spatial variation of depth-averaged tidal current velocities and directions were prepared for each simulation and are presented in Tetra Tech, Inc., 1981).

Figures 2 through 4 show examples of the computer graphics. Figure 2 shows the distribution of spring tidal currents at the time of maximum flood tide. The circulation component that can be attributed to a steady 5 meter/sec. SSW summer wind with tidal effects ignored is depicted in Figure 3. Winds appear to have a negligible effect on current patterns relative to tidal action. Figure 4 illustrates water circulation during flood tide under conditions of a northeast storm coincident in time with spring tide.

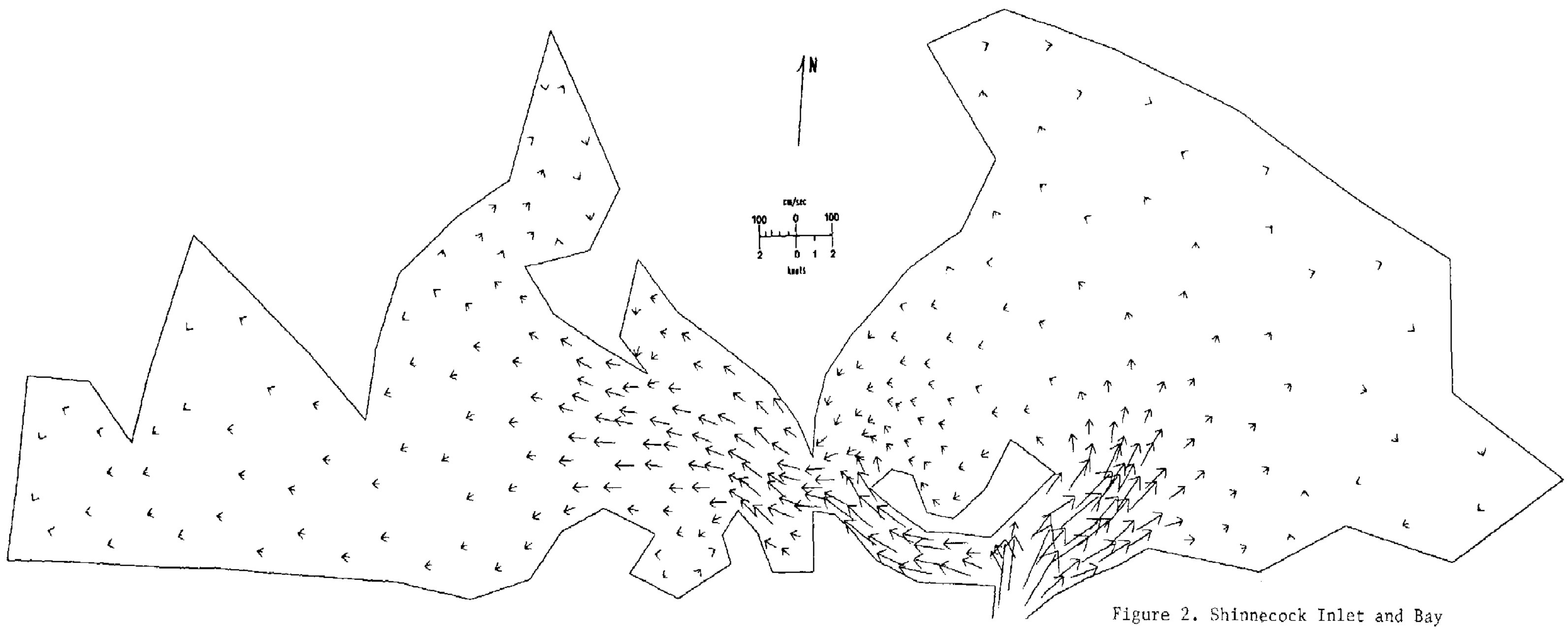

Figure 2. Shinnecock Inlet and Bay
Spring Tide Circulation
at Time of Maximum Flood

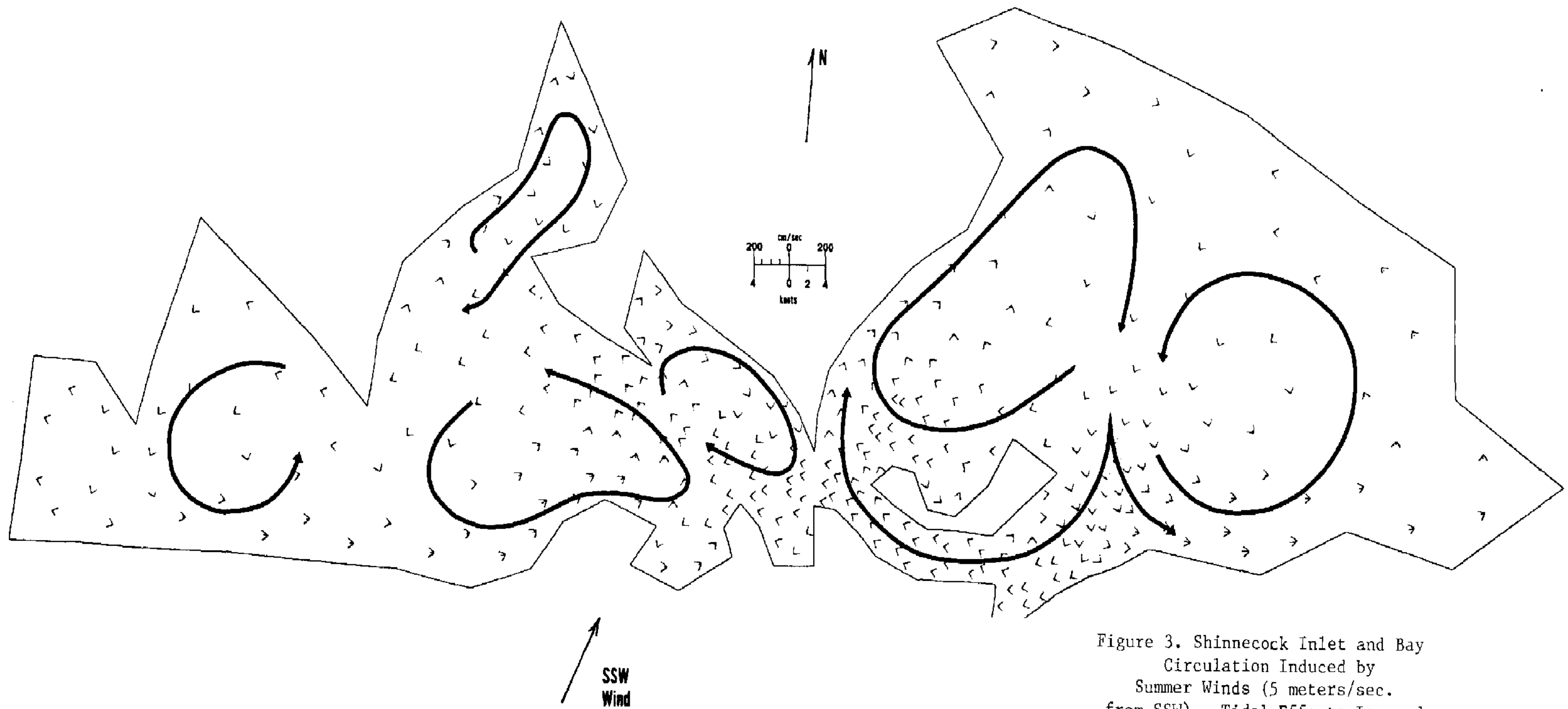

Figure 3. Shinnecock Inlet and Bay Circulation Induced by Summer Winds (5 meters/sec. from SSW) - Tidal Effects Ignored

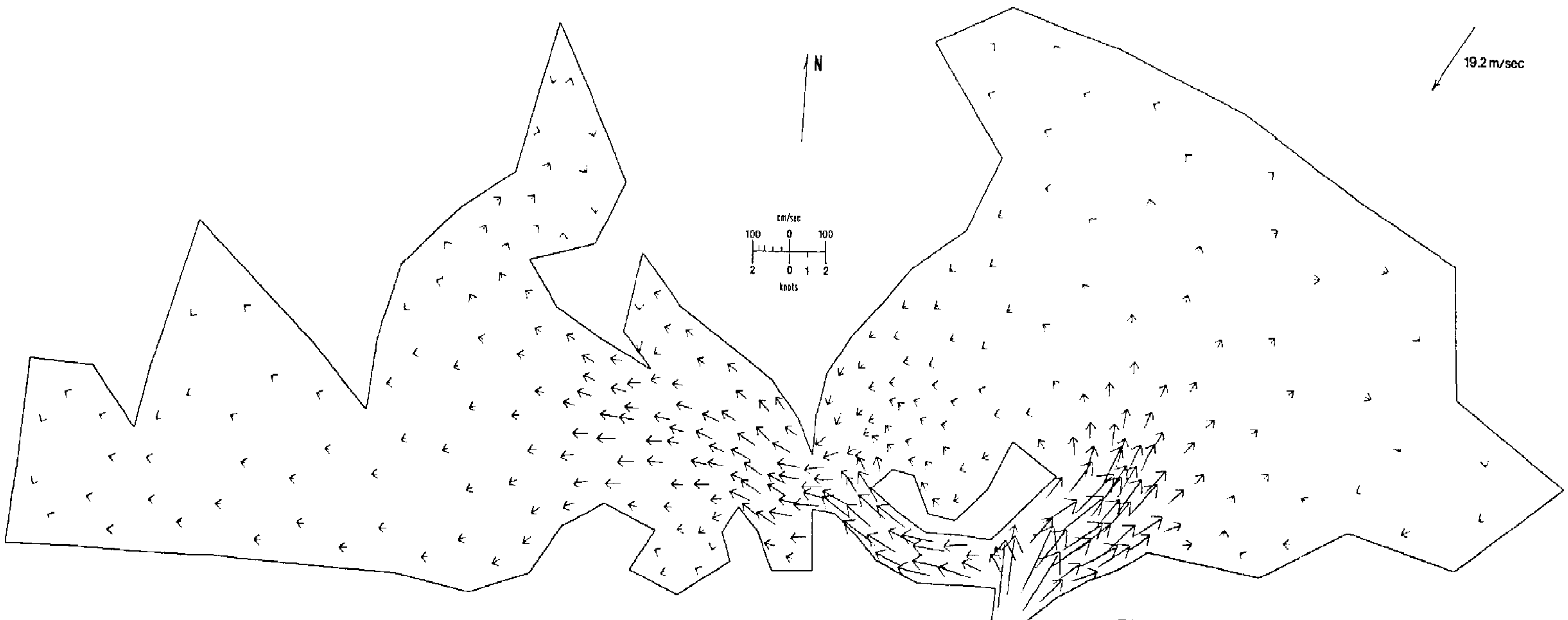

Figure 4. Shinnecock Inlet and Bay Northeast Storm Circulation Superimposed on Spring Tide - 4 Hours After Low Tide at Inlet

SECTION 5 RECOMMENDED OIL SPILL RESPONSE ACTIONS

5.1 INTRODUCTION

Long Island's Shinnecock Bay supports ecologically diverse resources which are of biological, aesthetic, recreational, and economic importance. An oil spill occurring in the coastal waters off Shinnecock Inlet could have adverse effects on all these resources. These effects could be prevented or minimized through the use of efficient spill control and containment actions. The feasibility of response actions and their potential effectiveness in combatting an oil spill are examined in this study. Spill response activities for only the initial tidal cycle are considered, since predicting oil spill behavior once a spill has contacted a shoreline is difficult. Also, it is difficult to estimate what percentage of the oil that entered Shinnecock Bay on the initial flood tide would remain there, and what percentage would pass back out the inlet and into the Atlantic ocean during ebb tide.

The degree to which these spill response actions can be effectively implemented is predicted using a wide variety of such incident specific factors as the amount of time after the spill before shoreline contamination occurs, oil type and quantity, available spill response resources, ocean currents and tides, and prevailing winds and temperature. By examining a hypothetical spill scenario that closely approximates an incident that could occur, the feasibility and effectiveness of response actions can be predicted with sufficient accuracy for planning purposes.

5.2 DETAILS OF OIL SPILL SCENARIO

The scenario put forth in this study represents the worst case major oil spill that could impact the Shinnecock Inlet region: a spill resulting from a tanker accident in the shipping lane approximately 24 nautical miles offshore.

5.2.1 Scenario Parameters

This scenario involves a major crude oil spill associated with an 85,000 DWT tanker casualty. Such an incident would most likely involve a collision with another vessel. The location of the casualty is approximately 24 miles south of Shinnecock Inlet at 72° 28' 24" W, 40° 26' 36" N. Other spill scenario parameters include the following:

- o Spill Size. Loss of two adjacent cargo tanks is assumed, approximate volume of 107,000 bbls (16,000 tons), total release within minutes.
- o Oil Characteristics. Oil density of 0.854 gm/cm^3 (34° API Gravity), pour point of -15°F, viscosity of 43 sus at 100°F.
- o Season. Summer.
- o Tide. Slick encounters Shinnecock Inlet at maximum flood tide.
- o Wind. From south at 10 knots.
- o Waves. Calm conditions, waves less than 1 foot in Shinnecock Bay.
- o Temperature. 80°F.

5.2.2 Spill Movements

Predictions of oil slick movement were extrapolated from current modeling provided by Tetra Tech, Inc. (1981). Slick spreading and wind deflection were also incorporated. Oil slick spreading was calculated using the equations of Premack and Brown (1973). The wind deflection was added graphically using vector addition and a factor of 3 percent of wind speed.

South winds and general circulatory patterns would drive the slick northward 24 miles to Shinnecock Inlet in approximately 81 hours. The diameter of the slick when it reaches the shores of Long Island would be 2.25 nautical miles. Much of the slick would wash ashore on the barrier island beaches adjacent to Shinnecock Inlet, and it is difficult to determine exactly how much of the oil reaching Long Island would pass through the inlet and into Shinnecock Bay. However, at maximum flood tide it is believed that a considerable entraining effect would occur near the inlet and perhaps 20 percent of the oil (8800 barrels) remaining after 81 hours would enter the .2-mile wide inlet.

Under the conditions presented in this scenario, including air temperature of up to 80°F and a slick thickness which decreases from 7.5 mm at 1 hour to .12 mm at 81 hours, the light crude oil would be subject to considerable evaporative loss. This loss would decrease the slick's volume by approximately 59 percent (Mackay et al., 1980), from 107,000 to 43,900 barrels, during the initial 81 hours.* It should be noted that the majority of this evaporative loss consists of the oil's toxic, low molecular weight hydrocarbon components such as benzene and toluene.

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*Considerable controversy exists today concerning the determination of evaporative losses from petroleum products. In calculating these losses for Jones and Shinnecock Inlets, Dr. Donald Mackay's methods were employed. Mackey, a professor at the University of Toronto, is considered the leading authority on this subject. However, since the science of determining these losses is still in its infancy, the accuracy of results using various methods is in question. Using Mackey's method gives evaporative losses which tend to be higher than expected, but at the present this method is the most accepted one.

Upon entering the inlet, the oil slick would be driven northward toward eastern Shinnecock Bay and westward past Ponquogue Point and into western Shinnecock Bay and Tiana Bay. With time, currents would carry some of the oil from eastern Shinnecock Bay southwest under Ponquogue Bridge toward western Shinnecock Bay. With the existing southerly winds, oil contamination of the southern shores of Shinnecock Bay would occur only near the inlet itself and at Lanes Island. During the initial flood tide, contamination of the northern and eastern shores of eastern Shinnecock Bay would not occur. Major shoreline contamination would occur between Ponquogue Point and Cormorant Point, between Ponquogue Point and Rampasture, between East and West Points, and between Pine Neck Point and West Tiana.

Figure 5 shows the extent of shoreline oil contamination that would occur inside Shinnecock Bay on the initial flood tide, without implementation of the recommended response actions. Approximately 10 miles of shoreline would be impacted. The majority of this impacted shoreline is of a commercial or residential nature; only about 2 miles are marsh shoreline. Approximately 2 miles of ocean beach on either side of the inlet would be initially contaminated by the slick. Over time, the slick would move westward due to longshore current patterns, extending the shoreline beach contamination toward Moriches Inlet.

It is difficult to ascertain the amount of shoreline inside the Bay that would be contaminated once the recommended response actions have been implemented. With the fast currents in the inlet, it is difficult to estimate how effective the diversion booms would be in containing the oil. The exclusion booms across pond entrances, Smith and Wells creeks would be effective in keeping oil from contaminating these small estuaries.

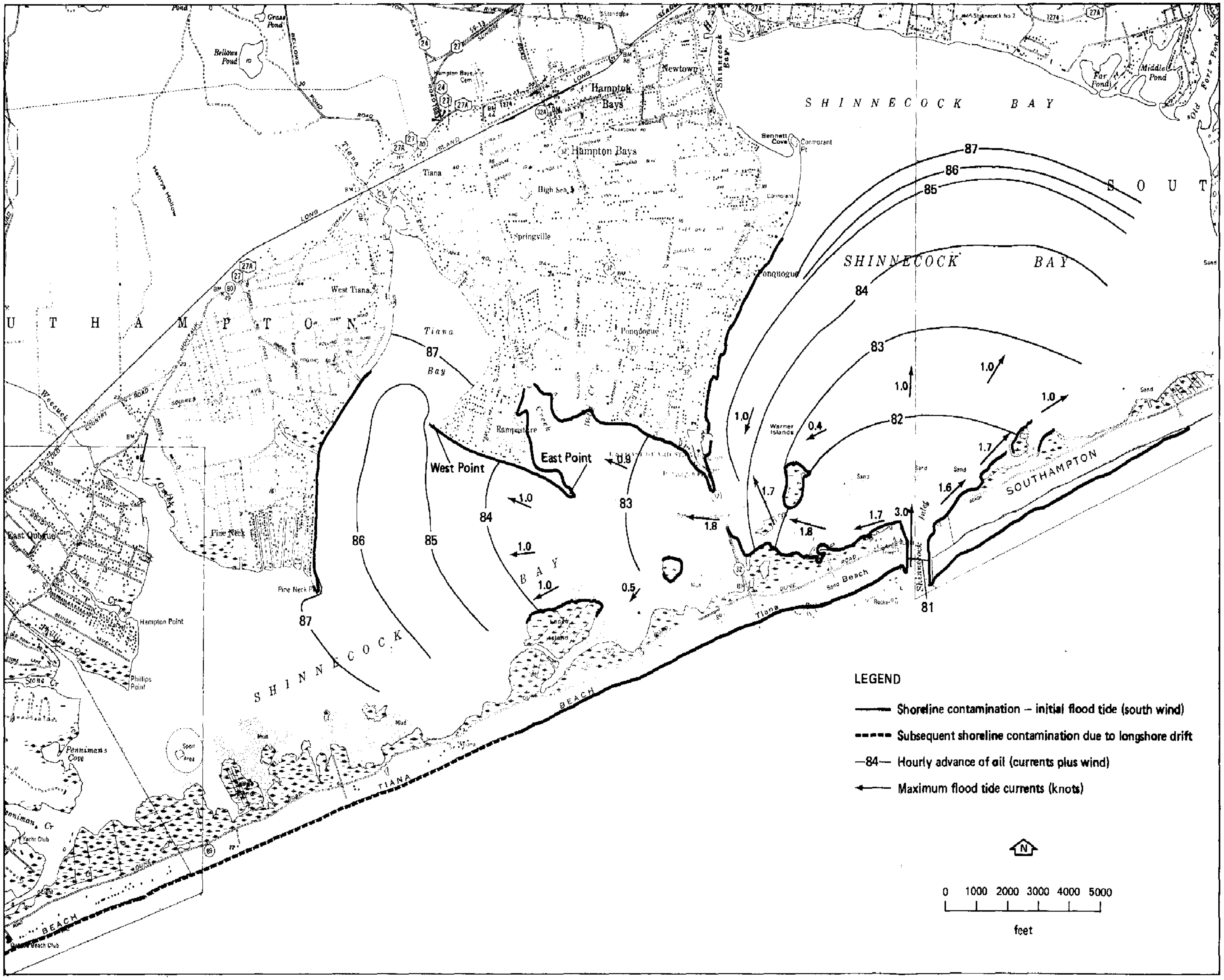

Figure 5. SHORELINE CONTAMINATION WITHOUT RESPONSE IMPLEMENTATION

5.3 PRIORITY ANALYSIS

A large crude oil spill would have dramatic environmental effects on most of the area's resources which makes it difficult to establish which of these resources should receive protection and cleanup priority in the event of such a spill. All the marshlands in Shinnecock Bay should receive priority consideration. The most extensive tidal marshes are located on the barrier island adjacent to Shinnecock Inlet. Not only are these marshlands susceptible to the toxic and smothering effects of spilled oil, but oil also tends to persist for longer periods of time in these areas. These tidal marshes are inhabited by common, roseate and least terns, snowy egrets, and various species of herons.

Since the barrier island beaches adjacent to Shinnecock Inlet are visited by large numbers of people during the warmer months, they too should receive priority consideration. Oil on these beaches or in the near shore zone would drastically curtail visitor usage. Since there is little recreational use of these beaches during the winter months, greater emphasis could be placed in protection and cleanup of the marshlands where spilled oil would create more long-term problems.

In Shinnecock Bay, hard clams and bay scallops are harvested for both recreational and commercial purposes. Soft clams are harvested near the barrier island tidal marshes of eastern Shinnecock Bay. Protection of these clamming beds should receive priority consideration.

The marinas in Shinnecock Bay also should receive priority consideration. These marinas are concentrated in 3 main areas: Ponquogue, Shinnecock Canal, and Shinnecock Inlet.

Residential and commercial shoreline would receive secondary consideration during spill containment and cleanup because of its less

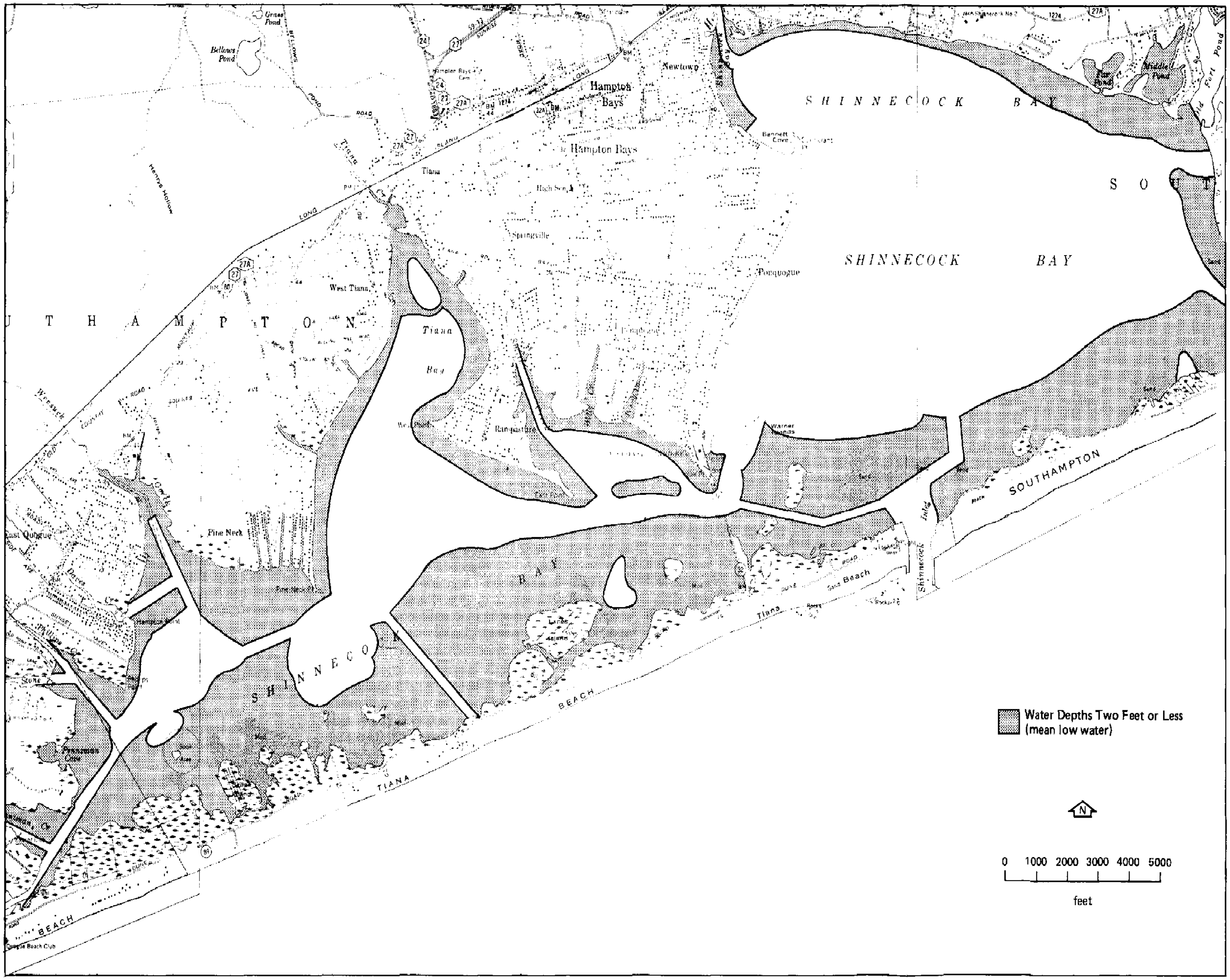

Figure 6. WATER DEPTHS TWO FEET OR LESS (mean low water)

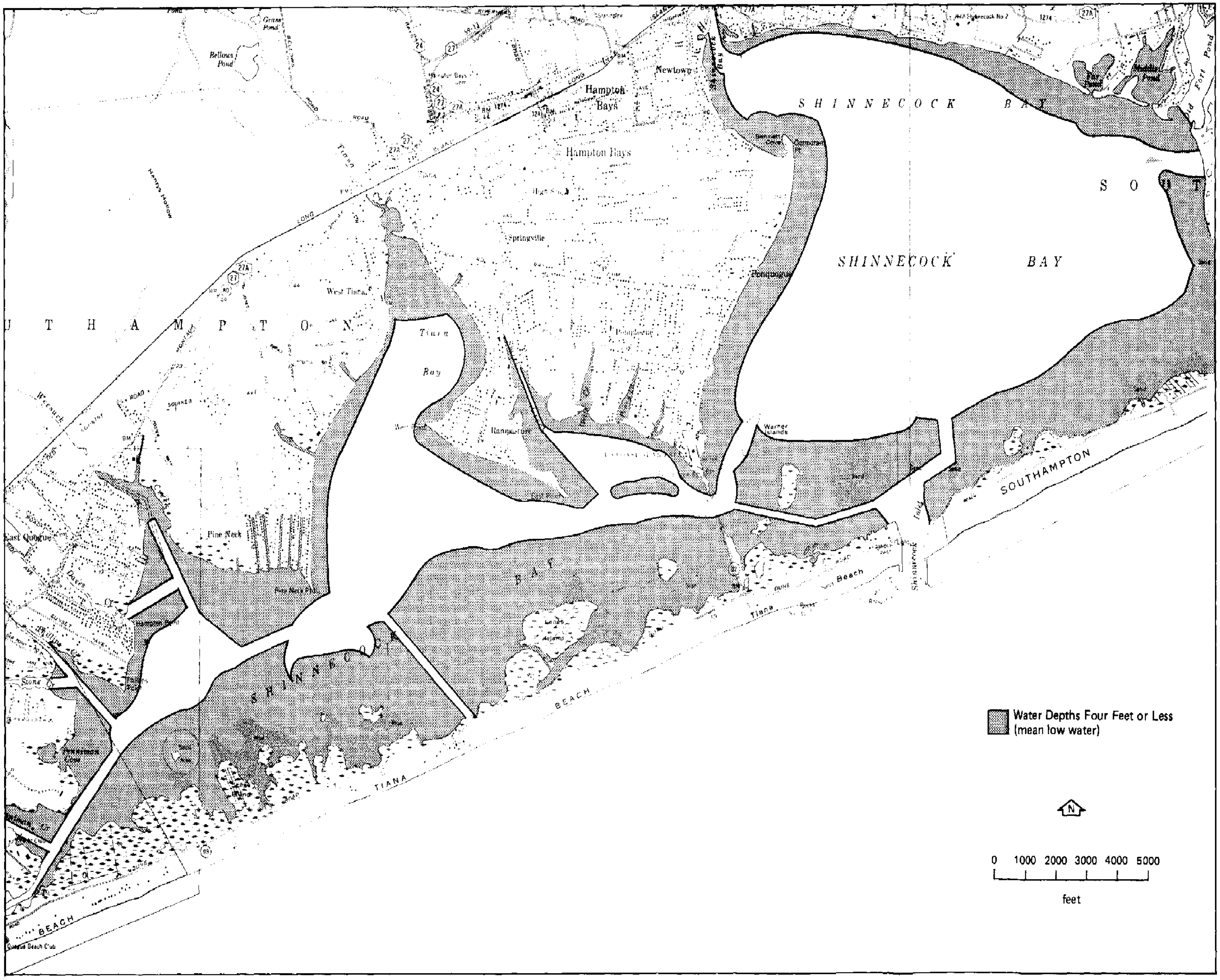

Figure 7. WATER DEPTHS FOUR FEET OR LESS (mean low water)

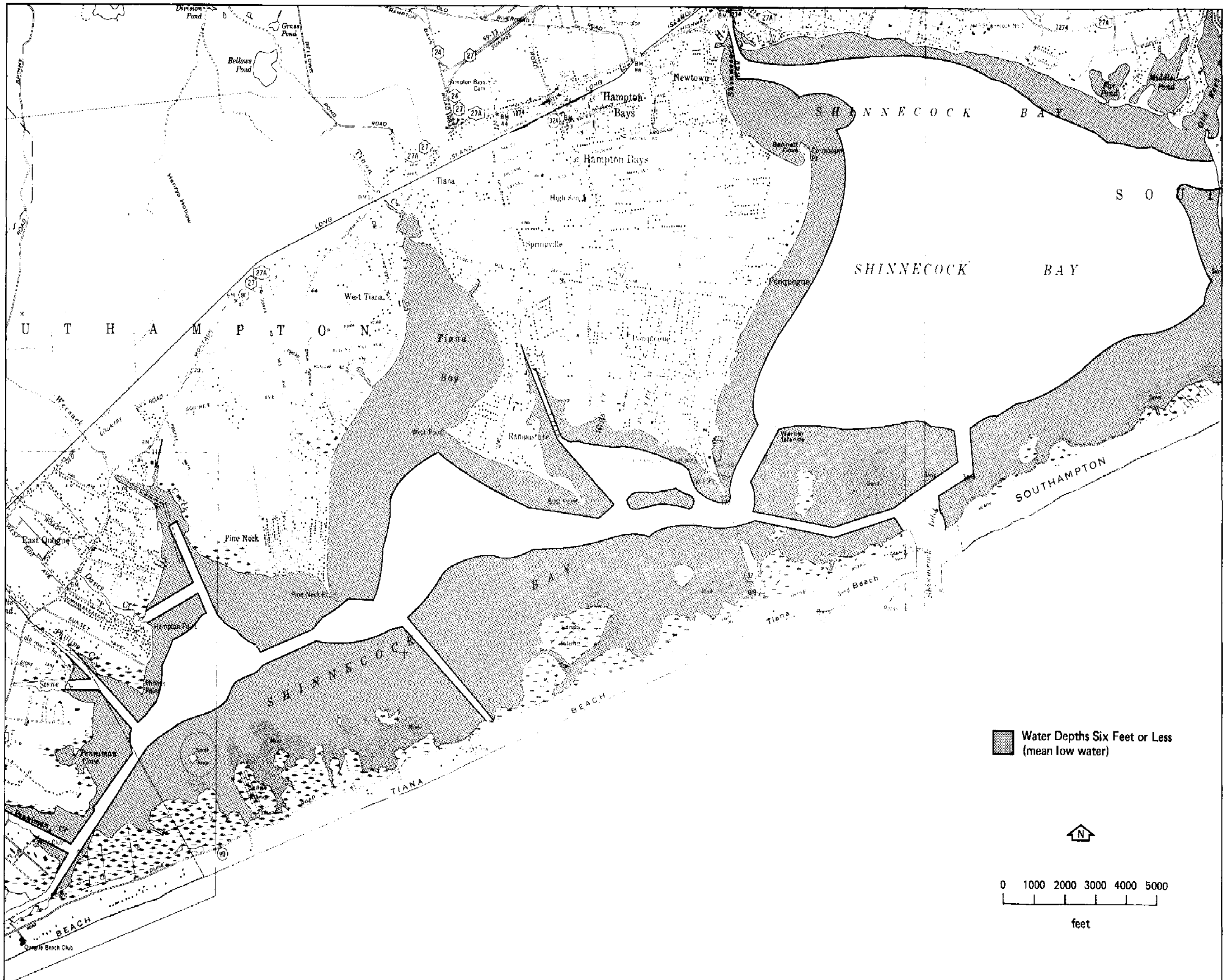

Figure 8. WATER DEPTHS SIX FEET OR LESS (mean low water)

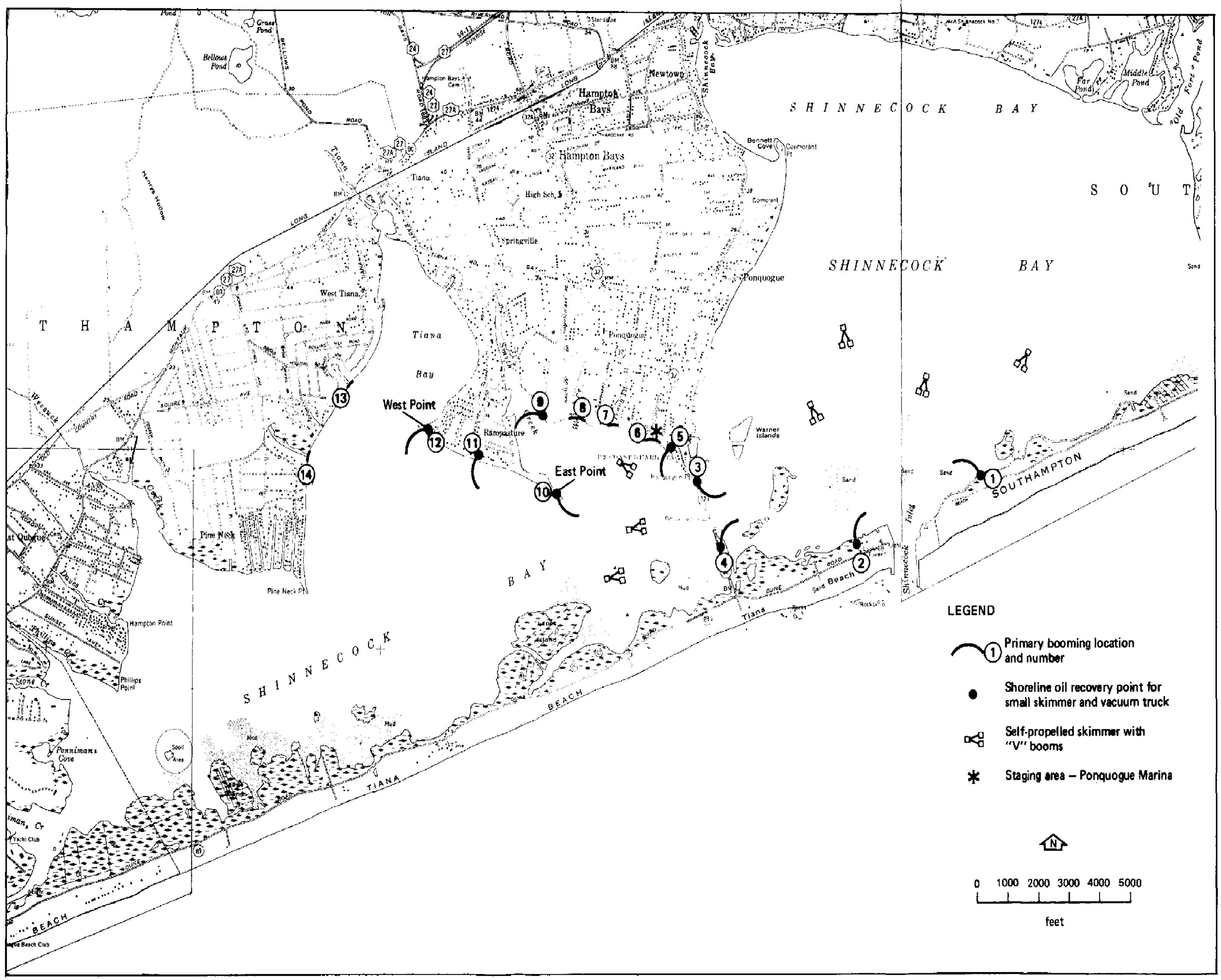

Figure 9. RESPONSE ACTION LOCATIONS

sensitive nature. Residential use is concentrated in 3 areas: Weesuck Creek, Pine Neck Point, and Tiana Bay. Commercial shoreline is concentrated mainly around Shinnecock Canal.

Most of the north shore of the Shinnecock Bay is less sensitive to oil spills because it is composed mainly of beach bluffs with only minor tidal marshland.

All booming locations referred to herein are designated primary sites due to their ecological sensitivity or economic value, and should receive priority consideration in the event of a spill. Although some of the diversion booms are not situated at sensitive sites, their implementation is essential because with their strategic location they are capable of minimizing oil spill impact at other primary sites.

5.4 RESPONSE ACTIONS

Response to an oil spill typically includes attempts to contain the spilled oil, to exclude it from environmentally sensitive areas, and to remove it. When considering overall impact, response actions that limit the area of oil contamination are most significant. For the scenario in question, feasible protection response actions to the predicted movement of the spilled oil were considered. These actions were developed by setting priorities for sensitive areas which might be impacted by spilled oil. Type and amount of oil spill equipment available in the New York area, prevailing environmental conditions (water depth, current velocities, access, areas of natural oil accumulation), and spill response times were all considered in determining the feasibility of the responses.

Two factors make oil spill control and cleanup response actions difficult to conduct in Shinnecock Inlet and Bay: the presence of shallow water and shoals, and the fast currents. Figures 6, 7, and 8 show the areas within Shinnecock Bay with water depths less than 6, 4, and 2 feet (mean low water) respectively. Approximately 50 percent of the water area in Shinnecock Bay is less than 6 feet deep (mean low water). Six of the seven self-propelled skimmers available for use in the area have a draft of 6 feet, which restricts their operational area to the central portions of Shinnecock and Tiana Bays and the dredged channels, all of which have depths of 6 feet or greater. The seventh skimmer, the JBF-3001, has a 4 foot draft.

Figure 5 shows the maximum flood tide current velocity for selected locations within Shinnecock Inlet and Bay. The fast currents (up to 3 knots) in the inlet make the use of booms there ineffective in containing or diverting oil (Vanderkooy et al., 1976). Current velocities in Shinnecock and Tiana Bays are slower but still significant enough to limit the length of diversion booms because of the high tensile loads placed on the booms by the force of the currents (diversion booms should not exceed 1500 feet in length).

Since the fast currents in Shinnecock Inlet make standard booming techniques unfeasible, oil passing through the inlet must be allowed to migrate to the more quiescent waters of Shinnecock Bay before it can be contained or cleaned up. Once inside the inlet, currents would carry the oil up into eastern Shinnecock Bay or past Ponquogue Point into western Shinnecock Bay and Tiana Bay. Figure 9 shows the locations of booming sites and points were vacuum trucks or units would be placed on the shoreline to recover oil. Diversion booms placed on the north side of the barrier island, on both sides of the inlet, would be used to contain as much of the initial influx as possible. Small skimmers would be used to pick up oil collected at all diversion boom locations, as well as at the Smith Creek exclusion boom point. Exclusion booming would be used to prevent contamination of the creeks and marinas at Ponquogue and the two sites at the west end of southern Tiana Bay. Table 1 lists response actions for the Shinnecock Bay area.

In the event that the southerly winds persisted during subsequent tidal cycles, contamination of the northern and eastern shores of Shinnecock Bay could occur. Under these conditions the following response actions should be implemented.

Shinnecock Canal	- exclusion booming, 1500 ft.
Far Pond	- exclusion booming, 300 ft.
Middle Pond	- exclusion booming, 400 ft.
Old Fort Pond	- exclusion booming, 1000 ft.
West end, Heady Creek	- exclusion booming, 1000 ft.

Table 2 gives the estimated total response time for boom deployment at each location with equipment supplied by local spill contractors. These response times take into account a period of 6 hours (average taken from Table 3) for the contractors to transport their equipment to Ponquogue Marina and to get the equipment in the water. The total response times given in Table 4 take into account that the required amount of oil spill boom is stored at Ponquogue Marina and that the Suffolk County Police Dept., the U.S. Coast Guard, or other local groups carry out the response actions. In this instance, 1.5 hours are required to mobilize and get the booms in the water, compared to 6 hours with a contractor response force. Also considered in the total response time are travel time from Ponquogue Marina to the boom

Table 1. BOOMING LOCATIONS AND EQUIPMENT/MANPOWER REQUIREMENTS

Booming Location and Number	Length and Boom Type Required	Equipment and Manpower Required to Deploy and Maintain Booms and Skim Oil[1]	Response Time from Ponquogue Marina	First Day Response Action Cost[2]
1 Southhampton Beach-Diversion Booming	1500' Optimax Curtain Boom	1 - Boat w/3-man crew would remain to tend boom 1 - Vacuum truck and 2-man crew w/small skimmer on shore 6 - Anchors	2 hrs	$1500
2 Shinnecock Marina-Diversion Booming	1500' Optimax Curtain Boom	1 - Boat w/3-man crew would remain to tend boom 1 - Vacuum truck and 2-man crew w/small skimmer on shore 6 - Anchors	1.75 hrs	$1500
3 Ponquogue Bridge-North-Diversion Booming	1500' Optimax Curtain Boom	1 - Boat w/3-man crew would remain to tend boom 1 - Vacuum truck and 2-man crew w/small skimmer on shore 6 - Anchors	1.25 hrs	$1500
4 Ponquogue Bridge-South-Diversion Booming	1500' Optimax Curtain Boom	1 - Boat w/3-man crew would remain to tend boom 1 - Vacuum truck and 2-man crew w/small skimmer onshore 6 - Anchors	1.5 hrs	$1500

Table 1. BOOMING LOCATIONS AND EQUIPMENT/MANPOWER REQUIREMENTS (continued)

Booming Location and Number	Length and Boom Type Required	Equipment and Manpower Required to Deploy and Maintain Booms and Skim Oil[1]	Response Time from Ponquogue Marina	First Day Response Action Cost[2]
5 Bayview House Diversion Booming	1500' Optimax Curtain Boom	1 - Boat w/3-man crew would remain to tend boom 1 - Vacuum truck and 2-man crew w/small skimmer on shore 6 - Anchors	1.25 hrs	$1500
6 Ponquogue Marina-Exclusion Booming	600' Optimax Curtain Boom	1 - Boat w/2-man crew would remain to tend boom and allow boats in and out of the marina 3 - Anchors	0.5 hrs	$400
7 Penny Pond-Exclusion Booming	450' Optimax Curtain Boom	1 - Boat w/2-man crew 3 - Anchors	0.75 hrs	$450
8 Wells Creek-Exclusion Booming	600' Optimax Curtain Boom	1 - Boat w/2-man crew 3 - Anchors	0.75 hrs	$500
9 Smith Creek Exclusion Booming	1500' Optimax Curtain Boom	1 - Boat w/3-man crew 1 - Vacuum truck and 2-man crew w/small skimmer on shore 6 - Anchors	1.5 hrs	$1500
10 East Point-Diversion Booming	1500' Optimax Curtain Boom	1 - Boat w/3-man crew would remain to tend boom 1 - Vacuum truck and 2-man crew w/small skimmer on shore 6 - Anchors	1.5 hrs	$1500

Table 1. BOOMING LOCATIONS AND EQUIPMENT/MANPOWER REQUIREMENTS (concluded)

Booming Location and Number	Length and Boom Type Required	Equipment and Manpower Required to Deploy and Maintain Booms and Skim Oil[1]	Response Time from Ponquogue Marina	First Day Response Action Cost[2]
11 Rampasture-Diversion Booming	1500' Optimax Curtain Boom	1 - Boat w/3-man crew would remain to tend boom 1 - Vacuum truck and 2-man crew w/small skimmer on shore 6 - Anchors	1.75 hrs	$1500
12 West Point-Diversion Booming	1500' Optimax Curtain Boom	1 - Boat w/3-man crew would remain to tend boom 1 - Vacuum truck and 2-man crew w/small skimmer on shore 6 - Anchors	2.0 hrs	$1500
13 Unnamed Pond-Exclusion Booming	450' Optimax Curtain Boom	1 - Boat w/2-man crew 3 - Anchors	1.75 hrs	$600
14 Unnamed Pond-Exclusion Booming	450' Optimax Curtain Boom	1 - Boat w/2-man crew 3 - Anchors	1.75 hrs	$600
Deeper Waters-Self-Propelled Skimmers w/"V" Booms	1400' Optimax Curtain Boom (2-100' sections w/each skimmer)	14 - Boats w/2-man crews 7 - Self-propelled skimmers w/2-man crews	0.75 hrs	$30,000

[1] Source: C.R. Foget et al. 1979.
[2] Source: Appendix B

Table 2. DEPLOYMENT TIMES FOR RESPONSE ACTIONS

	Average Minimum Response Time to Ponquoque Marina-Boats and Boom in Water (hours)	Booming Location	Travel Time to Boom Deployment Location (hours)	Time Required to Deploy Boom at Location (hours)	Lag Time (hours)	Total Response Time (hours)
Response By Contractors With Equipment From Their Home Base	6.0	Southhampton Beach	1.0	1.0	0	8.0
		Shinnecock Marina	0.75	1.0	0	7.75
		Ponquogue Bridge-North	0.25	1.0	3.0	10.25
		Ponquogue Bridge-South	0.5	1.0	2.0	9.5
		Bayview House	0.25	1.0	3.0	10.25
		Ponquogue Marina	0	0.5	0	6.5
		Penny Pond	0.25	0.5	0	6.75
		Wells Creek	0.25	0.5	0	6.75
		Smith Creek	0.5	1.0	0	7.5
		East Point	0.5	1.0	1.0	8.5
		Rampasture	0.75	1.0	1.0	8.75
		West Point	1.0	1.0	1.0	9.0
		Unnamed Pond	1.25	0.5	0	7.75
		Unnamed Pond	1.25	0.5	0	7.75

Table 3. RESPONSE TIMES FOR OIL SPILL CONTRACTORS IN THE SHINNECOCK INLET AREA

Contractor	Distance to Inlet	Mobilization Time[1]	Travel Time[2]	Boom Deployment Time[3]	Boat Deployment Time	Total Response Time
Clean Harbors (Verrazano Bridge)	95 mi	1.5 hrs	2.5 hrs	Compactible--1 hr Standard--2 hrs	.25 hrs	5.25 to 6.25 hrs
Clean Harbors (Upper Arthur Kill)	102 mi	1.5 hrs	2.5 hrs	Compactible--1 hr Standard--2 hrs	.25 hrs	5.25 to 6.25 hrs
Clean Harbors (Perth Amboy)	110 mi	1.5 hrs	2.75 hrs	Compactible--1 hr Standard--2 hrs	.25 hrs	5.5 to 6.5 hrs
Clean Venture (Linden)	105 mi	1.5 hrs	2.5 hrs	Standard--2 hrs	.25 hrs	6.25 hrs
Coastal Services (Elizabeth)	102 mi	1.5 hrs	2.5 hrs	Standard--2 hrs	.25 hrs	6.25 hrs
Marine Pollution Control (Port Jefferson)	32 mi	1.5 hrs	.75 hr	Standard--2 hrs	.25 hrs	4.5 hrs
Clean Water (Toms River)	150 mi	1.5 hrs	4 hrs	Standard--2 hrs	.25 hrs	7.75 hrs
AAA Pollution (Long Island City)	95 mi	1.5 hrs	2.5 hrs	Standard--2 hrs	.25 hrs	6.25 hrs
Moran-Crowley (Carteret)	105 mi	1.5 hrs	2.5 hrs	Standard--2 hrs	.25 hrs	6.25 hrs

[1] Includes .5 hrs for notification and 1 hr to get equipment on the road.
[2] Average speed of 40 mph.
[3] Time required to unpack assemble, and launch 1,000 ft of boom.

Table 4. DEPLOYMENT TIMES FOR RESPONSE ACTIONS

	Average Minimum Response Time to Ponquoque Marina-Boats and Boom in Water (hours)	Booming Location	Travel Time to Boom Deployment Location (hours)	Time Required to Deploy Boom at Location (hours)	Lag Time (hours)	Total Response Time (hours)
Response By Suffolk County Police Department, U.S. Coast Guard, or Other Local Group if Booms are Stored at Ponquogue Marina. Vacuum Trucks from Local Contractors.	1.5	Southhampton Beach	1.0	1.0	0	3.5
		Shinnecock Marina	0.75	1.0	0	3.25
		Ponquogue Bridge-North	0.25	1.0	3.0	5.75
		Ponquogue Bridge-South	0.5	1.0	2.0	5.0
		Bayview House	0.25	1.0	3.0	5.75
		Ponquogue Marina	0	0.5	0	2.0
		Penny Pond	0.25	0.5	0	2.25
		Wells Creek	0.25	0.5	0	2.25
		Smith Creek	0.5	1.0	0	3.0
		East Point	0.5	1.0	1.0	3.0
		Rampasture	0.75	1.0	1.0	3.25
		West Point	1.0	1.0	1.0	4.5
		Unnamed Pond	1.25	0.5	0	3.25
		Unnamed Pond	1.25	0.5	0	3.25

deployment location, time required to deploy the boom and anchors once on site, and a lag time. A lag time is added to some of the total response action times because it is highly unlikely that separate boats would respond simultaneously to each booming location. There are a sufficient number ofboats in the area to do this, but having too many boats in the water at one time would create congestion, delay response actions, and increase the risk of accidents. Therefore, response action priorities based on environmental sensitivity and values determine which sites are responded to first.

In computing reponse times for Tables 1 and 3, eight boats were used for boom deployment. Each boom would be placed in the water at Ponquogue Marina, where it would then be towed by one of the eight boats to the specific booming locations. Approximately 10 hours would be required to deploy booms at all the locations. Since roughly 80 hours pass from the time of the accident to the slick's arrival at Shinnecock Inlet, there should be more than adequate time to complete all the necessary boom response actions. With this much response time available prior to the slick's arrival, the booming of the various sites does not have to follow a priority sequence based on environmental sensitivity or value. After deploying all the necessary booms, the eight boats would remain at the eight diversion booming sites. Using the fewest possible number of deployment boats would limit the traffic in or out of the marina, response times would not be only delayed due to the congestion, but the risk of an accident would increase. The Coast Guard would assume control of all boat traffic in the area to minimize interference.

An additional boat would be positioned with the exclusion boom at Ponquogue Marina to allow necessary spill response craft to enter or leave the marina.

The total response times given are for optimum conditions. Calls for assistance during other than working hours (nights, weekends, or holidays), poor road conditions, heavy road traffic, or inclement weather could increase these times by a factor of two or three. Also, in both contractor and local group responses, anywhere from 3 to 10 hours are required for vacuum truck arrival.

Self-propelled skimmers are positioned in the deeper and/or more quiescent waters inside the inlet to pick up oil. Due to the abundance of shallow waters within Shinnecock, the skimmers' range would be limited mainly to the deeper waters in the middle of both Shinnecock and Tiana Bays, as well as the dredged channels of sufficient depth (4 or 6 feet). Attaching booms to the skimmers in a "V" position would increase efficiency of oil recovery. Probable locations for these self-propelled skimmers are shown in Figure 5.

The estimated costs for implementation of spill response actions at each location during the first day (10 working hours) are given in Table 1. The total amount of equipment required and their rental costs are listed in Table 5. Total number of man-hours required and labor rates are given in Table 6. The $35,550 equipment rental cost and $14,850 labor cost give a total first day response action cost of approximately $50,000. This daily total cost would probably increase on subsequent days as additional booms, boats, and vacuum trucks were used and shoreline cleanup operations initiated.

Numerous mosquito ditches approximately 4 to 6 feet wide bisect the marshlands of Shinnecock Bay. These ditches provide pathways for oil to move into the interiors of the marshes. Although no current measurements were taken in these narrow channels, their placement and geometry suggest that currents are most often less than 0.25 to 0.3 of a knot. In the presence

Table 5. EQUIPMENT RENTAL COST FOR ONE 10-HOUR DAY

Equipment	Amount/Number Required	Rental Cost	Total
Boom	15,050 ft	$ .35/ft	$ 5,300
Work Boats	20	200/day	4,000
Small Skimmers	7	50/day	350
Vacuum Trucks	6	300/day	1,800
Storage Tank	1	200/day	200
JBF 3003 Skimmer	4	4,000/day	16,000
JBF 3001 Skimmer	1	2,300/day	2,300
Bennett MK6E Skimmer	1	2,600/day	2,600
Marco Class ID Skimmer	1	1,000/day	1,000
	TOTAL		$ 33,550

Table 6. LABOR COST FOR ONE 10-HOUR DAY

Activity	Man Hours Required in 10-Hour Day	Labor Rate	Total
Boom Deployment	130	$ 15.00/hr	$ 1,950
Boom Maintenance	140	15.00/hr	2,100
Skimmer Maintenance	140	15.00/hr	2,100
Vacuum Truck Support	60	15.00/hr	900
Self-Propelled Skimmer	140	15.00/hr	2,100
"V" Boom Boats	280	15.00/hr	4,200
Miscellaneous	20	15.00/hr	300
Total	910	Total	$ 13,650

of these low currents, two or three sorbent boom sections (each 8 feet long) placed in parallel lines across the ditch openings should be sufficient to exclude oil. The sorbent boom sections should be anchored to each side of the ditch by wooden or metal stakes driven into the bank. A two-man crew in a shallow draft boat would require about 0.5 hour to place two or three sorbent boom sections across a mosquito ditch entrance. In the presence of spring or maximum flood tides when current velocities exceed 1 knot these sorbent booms would be ineffective.

To prevent a large oil mass from contaminating the barrier island beaches, chemical dispersants should be used. A ship or airborne dispersant spraying system would be used to chemically treat the oil slick while it is still offshore. When dispersants are applied to the slick, the oil breaks into small droplets which in the presence of sufficient wave energy mix into the water column. By forming droplets, the oil's surface area would be increased, thereby enhancing evaporation and biodegradation. Below the surface, these droplets would form a plume. Carried by subsurface currents, some of this dispersed oil would reach the ocean beaches or enter Shinnecock Bay. However, since dispersed oil does not adhere to objects as readily as untreated oil, impact would be minimized. Longshore drift would carry more dispersed oil westward.

To lessen contamination of the ocean beaches, a 2-3 foot high berm could be constructed parallel to the shoreline at the midtide line. Motor graders would be best suited for berm construction, although bulldozers would be adequate also. Maintenance of the berm would include possible reconstruction daily.

Finally, spill response activities within Shinnecock Inlet after the first day are not considered in this analysis because of the difficulty in predicting spill behavior once oil has contacted a shoreline. However, cleanup of oil on the water and from shorelines could not be completed in just one day. Equipment would have to remain in place for 1-2 weeks.

5.5 SPILL RESPONSE ASSESSMENT

Approximately 81 hours would elapse before the oil slick would reach Shinnecock Inlet from the site of the accident, with an additional 1 to 6 hours for the slick to move to the various locations within Shinnecock and Tiana Bays. This would amount to more than adequate time for all containment and cleanup response actions, either by contractors or by local organizations.

Due to the unknown effectiveness of diversion booms in a particular situation, the fast currents, and the predominance of shallow water which limits the range of both booming and open water skimming, it is difficult to predict how much shoreline would be impacted when all response actions have been put into effect. However, it is probable that contamination of most tidal marshland and other sensitive areas could be averted through the implementation of the various response actions.

Since the abundance of shallow water within Shinnecock Bay limits the range of the self-propelled skimmers to the main channels and center bay regions, congestion and difficulty in maneuvering can arise if all seven available skimmers are deployed. A self-propelled skimmer, along with two "V" boom boats, require substantial room to operate. Due to these facts, it may not be advisable to operate all seven self-propelled skimmers simultaneously within Shinnecock Bay.

Since conventional booming and skimming techniques cannot stop the oil slick from impacting the barrier island beaches, dispersants should be used to treat the slick in offshore waters. Application of chemical dispersants could prevent or lessen shoreline contamination as long as the oil is amenable to dispersant treatment. A quick decision would have to be made if dispersants are to be used because anywhere from 24 to 36 hours are necessary to implement a dispersant spraying system. Therefore, steps should be taken to assemble dispersant application equipment and personnel immediately in the event of a major spill. The decisionmaking process leading to use of this alternative should also be initiated immediately. The decision to use dispersants should be made pending analysis of spill conditions and the relative threat posed to bay habitats. Dispersant use would be most practical during the summer months when visitor usage of these beaches is at its peak and the effects of beach contamination would be at a maximum.

5.6 EQUIPMENT PERFORMANCE

The booms listed in Table 1 for each response action are the type of boom which has performance characteristics (stability and shallow draft water use) best suited for the type of booming actions required. Since 17,450 feet of boom is required to carry out the necessary response actions and 20,000 feet of recommended boom type is available through local contractors, there is sufficient safety margin to account for boom which may be unavailable.

Oil terminal operators also have additional spill control booms.

The nine small skimmers which would be used in conjunction with booms at points of natural oil accumulation would be able to pick up oil at a rate of approximately 12,000 gallons per day.

The use of self-propelled skimmers is limited to the main channels as well as to the central portions of Shinnecock and Tiana Bays where the necessary 4 to 6 foot operational depth is present. The use of "V" booms with these skimmers increases their oil encounter rate by increasing their skimming width. The encounter rate is the volume of oil that a skimmer will encounter on a water surface over a given period of time. Factors influencing the encounter rate include the thickness of the oil slick on the water, the skimming path width, and the skimmer's forward speed. Skimming without booms can be performed effectively at speeds of up to 2 knots. Using "V" booms, skimmers would skim at approximately 1 knot so that oil would not be lost underneath the diversion booms. By deploying two short booms (each 100 feet in length) from each side of a skimmer's bow, the effective sweep width of a skimmer can be increased by a factor of four (that is a skimmer with a skimming width of 15 feet can skim with a 60-foot width). The major drawback to conducting this type of skimming is the difficulty in coordinating the maneuvering of three vessels in the restricted channels and the slower (1 kt) skimming speed. Table 7 lists performance criteria for four types of self-propelled skimmers which are currently available in the New York area (4 JBF 3003, 1 JBF 3001, 1 Bennett Mark VI, 1 Marco Class ID). Table 8 gives the daily oil recovery rates that might be expected from these skimmers with and without "V" booms. A total of approximately 43,900 gallons of oil could be picked up per day by the seven self-propelled skimmers. The rates given are average theoretical values over the period of operation. Initially, oil recovery rates would be higher and would decrease with time as the slick breaks up and dissipates. Actual recovery rates in a real spill could vary considerably from these average values, depending on weather conditions, presence of debris, local concentrations of oil, slick thickness, etc.

Table 7. SKIMMER PERFORMANCE CRITERIA

Skimmer	Water Depth Needed for Skimmer	Skimming Speed	Max. Oil Pickup Capability	Skimming Width	Skimming Width w/"V" Boom	On-Board Storage Capacity	Off-Loading Capacity	Oil Recovery Factor[1]		Oil Content Factor[2]	
								Diesel	Crude	Diesel	Crude
JBF 3003	6 ft	0-3 kts	450 GPM	18 ft	72 ft	4000 gal	450 GPM	65%	80%	40%	60%
JBF 3001	4 ft	0-3 kts	100 GPM	15 ft	60 ft	1500 gal	50 GPM	65%	80%	40%	60%
Bennett Mark 6E	6 ft	1-2 kts	350 GPM	14 ft	56 ft	2500 gal	350 GPM	88%	88%	52%	60%
Marco Class ID	6 ft	1-2 kts	50 GPM	10 ft	40 ft	500 gal	50 GPM	65%	80%	40%	60%

<u>Volume of Oil Recovered</u>

[1]Oil Recovery Factor = Volume of oil pesented to skimmer.
[2]Oil Content Factor = Percentage of oil in the liquid recovered by skimmer.

Source: L.B. Solsbery et al., 1977; W.F. Purres and L.B. Solsberg 1978; W.J. Logan et al. 1975.

Table 8. OIL RECOVERY EFFECTIVENESS OF SKIMMERS FOR CRUDE OIL SPILL

Skimmer	Actual Oil Recovery Rate Gallons/Hr[1]		Hours of Operation Until Storage Capacity is Reached[2]		Time Required to Offload at Ponquoque Marina[3] (hours)	Total Amount of Oil That Could be Recovered In 10-Hour Day (gallons)		Average Daily Oil Recovery[4] (gallons/day)		Number of Skimmers Available in the New York Area	Total Daily Oil Recovery (gallons/day)	
	Skimmer Only	Skimmer w/"V" Booms	Skimmer Only	Skimmer w/"V" Booms		Skimmer Only	Skimmer w/"V" Booms	Skimmer Only	Skimmer w/"V" Booms		Skimmer Only	Skimmer w/"V" Booms
JBF 3003	1,310	2,620	2.2	1.1	1.0	8,650	13,000	6,500	7,800	4	14,000	31,200
JBF 3001	1,090	2,180	1.0	0.5	1.0	5,450	6,500	4,100	4,500	1	4,100	4,500
Bennett Mark 6E	1,020	2,040	1.75	0.9	1.0	6,500	10,000	4,900	6,000	1	4,900	6,000
Marco Class ID	730	1,450	.50	0.25	1.0	2,600	3,000	2,000	2,200	1	2,000	2,200
TOTAL											25,000	43,900

[1]Actual Recovery Rate = Encounter Rate x Oil Recovery Factor - Encounter Rate calculated from skimming speed of 2 kts for free skimming and 1 kt for skimming with booms, sweep width, and oil thickness - Oil Loading: Crude Oil Thickness of 0.32 mm.
[2]Adjusted for oil content factor.
[3]Includes travel time to and from skimming area.
[4]Adjusted for downtime and maneuvering.
[5]Recovery rates would increase significantly if skimmers could be offloaded by barge at the skimming site.

SECTION 6 REFERENCES

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APPENDIX A

Review of Comments Submitted by Agencies and Firms with an Interest in Oil Spill Control

1. Suffolk County Department of Parks, Recreation and Conservation

Comment: Why not use the U.S. Coast Guard Station at Shinnecock as the response equipment deployment site instead of the private Ponquogue Marina?

Response: The Coast Guard Station was evaluated as a possible deployment site, however, due to limitations with the boat ramp it was determined not to be the most desirable site. The Coast Guard Station is a possible equipment storage and assembly site as well as a possible equipment service point during clean-up operations.

Comment: Permission should be secured, in advance, to use chemical dispersants on oil spills approaching Shinnecock Inlet.

Response: Use of dispersants is regulated by the Federal Government, which will not grant blanket approval to use dispersants. One of the criteria used in determining if dispersants should be used is the degree of difficulty expected in controlling the spill by mechanical means. This report documents the difficulty of mechanical control in Shinnecock Inlet and can be used as input into the decision process regarding the use of dispersants.

Comment: Why not use absorbent boom to combine containment and clean-up operations?

Response: Absorbent booms are not effective in the high current environments found in Shinnecock Inlet. Absorbent booms may be effective in the shallow portions of the bay or in protecting low current marsh channels.

Comment: Is the 81 hr. estimate for slick arrival at Shinnecock Inlet unrealistic?

Response: No; it is a realistic estimate for the spill as described in the scenario.

Comment: The Suffolk County Department of Emergency Preparedness should be utilized as a source of up-to-date information regarding oil spill response equipment.

Response: This department was contacted and it was determined that the most efficient method of conducting the equipment inventory was to contact the agencies directly. This procedure was used in this report.

2. New York State Department of Environmental Conservation

Comment: If the decision is made to apply chemical dispersants to the oil slick, when should they be applied?

Response: As soon as possible. Dispersants work best on unweathered oil. Also, the environmental impacts of the dispersant can be expected to be less in deeper water.

Comment: Is it possible to apply sinking agents to the slick?

Response: Such agents are not readily available and their environmental impacts are not well known.

Comment: During response operations could boat traffic present a problem?

Response: Yes, boat traffic could hamper response operations but the Coast Guard has the authority to control such traffic. (Note: The Coast Guard responded that under such conditions they would take the necessary steps to restrict boat traffic).

Comment: The response plan seems to emphasize diversion booming. Why not use booms to enclose oil spills?

Response: This approach would probably not be possible due to currents and quick reversal of tides, i.e., short duration of slack water. Skimming would seem to be most effective under these conditions.

Comment: Would it be possible to use boom to protect the south shore of the bay from wind driven currents?

Response: Wind generated currents would take several days to develop and would not be considered in the initial response actions. Given the conditions at Shinnecock, wind driven currents will have a minimal impact on spill movement.

Comment: Specific recommendations for berming should be added.

Response: According to EPA shoreline protection procedures, berms should be located at the midtide line. Berms should be constructed of material taken from the beach seaward of the berm.

Comment: It is not clear why contaminated wastes should not be burned.

Response: Burning of oil contaminated wastes creates air pollution problems.

Comment: The report does not recommend specific agency activities.

Response: Decisions regarding actions to be taken by various agencies would be made by the U.S. Government's On-Scene Coordinator.

3. N.Y.S. Department of Transportation

Comment: The scenario reflects a large amount of response time and is based on a spill 24 nautical miles offshore. In fact, the last threat to Long Island's south shore was from a barge only 8 miles offshore.

Response: The worst case scenario selected reflects the characteristics of petroleum transport in the New York Bight. Where the spill occurs changes the situation and response actions.

Comment: If oil was just outside the inlet, what would the first action be?

Response: It may be best to begin exclusion booming in the back bay area. Exclusion booming should take place first. Depending upon weather conditions diversion booming would be the second response. First and second level priorities (as identified in Fire Island Report) are not needed for Shinnecock Inlet.

Comment: If oil is stranded can it be bermed at midtide? Where should such an operation begin?

Response: See response to similar comment made by Department of Environmental Conservation.

4. Suffolk County Department of Health

Comment: Once a spill takes place at sea, to what extent can it be certain that other inlets will not be impacted?

Response: After a major spill has taken place it will take some time to determine slick direction and speed. This will in turn reduce response time. In the event of a major spill in variable weather conditions several south shore inlets may be threatened. Under such conditions it might be best to move equipment into a central location while tracking the slick before a final deployment decision is made.

5. Town of Brookhaven

Comment: Are the estimates for ship travel to and from the Port of New York averaged over the entire year?

Response: These estimates are based on information regarding the level of tanker traffic to the Port of New York, and are not averaged. The probability of the event is not quantitatively predicted in this report. However, since no home heating oil products are shipped through Shinnecock Inlet seasonal variations in petroleum traffic are not as important as for East Rockaway and Fire Island Inlets.

Comment: Are the cumulative impacts of smaller spills and non-point source oils more important than major spills? What can be done about it?

Response: Since there are no oil terminals on Shinnecock Bay chronic small spills are unlikely. Non-point source oils from runoff and operations near the bay may be impacting the marine environment. The control of oil discharges at upland locations is not within the scope of this project.

Comment: In light of new requirements regarding landfills there may be no place to dispose of oils and oily wastes.

Response: Disposal may be the most expensive and difficult part of the spill cleanup. Various governments may have to cooperate to solve this problem. This report deals mainly with response actions during the first tidal cycle. Disposal of oily wastes may present political problems requiring additional actions.

Comment: Who will transport the collected material to its final disposal location?

Response: Appendix C contains a discussion of disposal of recovered oil and oiled waste material. This appendix contains a listing of approved waste oil collectors and haulers.

Comment: There should be a regular joint meeting of all involved parties with a mock drill in order to give many agencies the experience in responding to oil spills.

Response: This is a very reasonable suggestion, and such meetings and drills should be part of the plan implementation.

6. Mobil Oil/N.Y.S. Petroleum Council

Comment: Availability of skimmers from Clean Harbors Cooperative may be exaggerated in the report.

Response: It is understood that delivery of several of Clean Harbors skimmers is pending.

Comment: It is unlikely that all of the equipment listed under various contractors and co-ops would be available at the same time.

Response: The response actions outlined in the report reflect a maximum effort. All of the equipment available may not be utilized due to congestion. Availability of co-op equipment may depend upon the source of the spill.

Comment: Response times may be unrealistic due to equipment requirements such as off-loading, set up and assembly. Equipment such as cranes, etc., may not be readily available at the site.

Response: Minimum response times are estimated. Bad weather, human error, etc., would result in longer times for deployment.

APPENDIX B

Part I - Inventory of Oil Spill Contractors and Equipment in the Long Island Region

In the event of an oil spill, an efficient and effective response is essential and can be achieved partially by familiarization with the contractors and equipment available for use in combatting oil spills. This Appendix identifies the local contractors and various operational aspects of oil spill equipment available in the Long Island area.

The type, manufacturer, quantity and location of the oil spill equipment owned by each contractor is listed in Table 1. Equipment which can be operated effectively in shallow water is denoted with an asterisk.

The rental costs for use of oil spill cleanup equipment are competitive and standardized throughout the industry. The costs are, however, subject to frequent change as are the equipment inventories of the various contractors. Table 2 gives the present rental costs for the equipment owned by two of the oil spill contractors listed in the previous table.

Equipment.

The primary types of equipment used in the containment and recovery of spilled oil are booms, skimmers and pumps. There are many varieties of each type of equipment available with some being better suited for certain purposes than others. A discussion of the characteristics of the different varieties of equipment is provided to enable the reader to determine which one is best suited for a specific purpose.

Booms. Booms are used primarily for containment or diverting spilled oil or for protecting areas from contamination. The brands of booms available from the various contractors are listed in Table 3 along with their specifications and capabilities.

Table 1. INVENTORY OF OIL SPILL CONTRACTORS EQUIPMENT

Clean Harbors Cooperative (Verrazano Bridge)(201) 738-2438

Booms

*9,000 ft	American Marine Optimax 7" x 12"
3,000 ft	Kepner Supercompactible Sea Curtain 12" x 18"
*5,000 ft	Kepner Supercompactible Sea Curtain 8" x 12"

Skimmers

1	JDF 3003 self-propelled vessel
*1	Centrifugal Systems Oil Mop w/500' of rope
1	Marco Class JD self-propelled vessel

Boats

*4	Raider 34' work boats w/2 - 150 hp motors
*4	Orca 22' deployment boats w/2 - 85 hp motors

Oil/Water Separation Equipment

None

Clean Harbors Cooperative (Upper Arthur Kill)

Booms

*14,000 ft	American Marine Optimax 7" x 12"
* 3,500 ft	Kepner Supercompactible Sea Curtain 8" x 12"

Skimmers

2	JBF 3003 self-propelled vessel
*1	Centrifugal Systems Oil Mop w/500' of rope

Boats

*1	Bennent 27' Sealander w/2 - 150 hp motors
*6	Orca 22' deployment boats w/2 - 85 hp motors

Oil/Water Separation Equipment

None

Clean Harbors Cooperative (Perth Amboy)

Booms

*13,000 ft	American Marine Optimax 7" x 12"
* 3,500 ft	Kepner Supercompactible Sea Curtain 8" x 12"

Table 1. Continued

Skimmers

1	JBF 3003 self-propelled vessel
1	JBF 3001 self-propelled skimming vessel
1	Centrifugal Systems Oil Mop w/500' of rope

Boats

1	Bennett 27' Sealander w/2 - 150 hp motors
5	Orca 22' deployment boats w/2 - 85 hp motors

Oil/Water Separation Equipment

None

AAA Pollution Specialist, Inc. (Long Island City, NY) 212-729-2122

Booms

5,500 ft	Uniroyal Sealdboom 6" x 12"
*3,000 ft	American Marine Optimax 7" x 12"

Boats

2	30 ft work boats
1	21 ft MAKO w/115 hp
*15	small work boats w/outboard motors

Skimmers

*5	ACME Model 400 skimmers
*2	ACME FS-40 Electric skimmers

Oil/Water Separation Equipment

4	3,000-5,000 gal vacuum trucks
3	4,400 gal tank trucks
5	3,000 gal tank trucks

Spill Response Trailers

1	32' communications and repair trailer

Communication Systems

6 sets	Walkie-talkies
3 sets	Mobile units (in vehicles)
1	55 channel marine band

Table 1. Continued

Advanced Environmental Technology Corp. (Morris Plains, NJ)
201-539-7111

A New York State licensed collector and transporter of hazardous wastes.

Booms

None

Boats

None

Skimmers

None

Oil/Water Separation Equipment

None

Spill Response Trailers

4	22' trucks
1	14' truck
5	44' trucks

Communication Systems

12 sets	Civilian band radios

Clean Venture (Linden, NJ) 201-862-5500

Booms

*13,000 ft	6" x 12" harbor boom
2,000 ft	12" x 24" Goodyear offshore inflatable high seas barrier boom

Boats

1	42' LCM twin screw 280 hp, 18 ton DWT
2	30' steel work boat
1	30' steel harbor tug
*6	22' work boats
*20	15'-19' work boats

Table 1. Continued

Skimmers

1	Bennett Mark 6E oil skimmer
*4	Swiss Oela skimmers
*4	Duck bill skimmers
*1	MK 209 oil mop skimmer & 300' mop

Oil/Water Separation Equipment

3	5,000 gal vacuum tractor trailer trucks
3	2,500 gal vacuum trucks (straight)
1	3,400 gal vacuum tractor trailer trucks
1	4,200 gal vacuum tractor trailer trucks

Communication Systems

10 sets	Communication trailer 8' x 35' roadable - marine and land lease communications (Motorola)
19 sets	Hand-held walkie-talkies

Spill Response Trailer

1	8' x 40' roadable - user: change area, eating area, first aid, shelter

Clean Water, Inc. (Toms River, NJ) 201-341-3600

Ship salvage and oil spill consultants - affiliated with Smit International (America), Inc.

Booms

* 4,000 bags	Filter Fence Sorbent C (Biodegradable) 4 cu ft 18 lb/bag
* 4,000 ft	5' filter boom (in one trailer)
2,250 ft	Harbor boom 8" x 24"
11,000 ft	Sea sentry boom 12" x 24"

Boats

None

Skimmers

None

Oil/Water Separation Equipment

2	12' x 4' x 5' API separators

Table 1. Continued

Spill Response Trailers

1	40' parts trailer

Communication Systems

3 sets	VHF 14 channel
8 sets	Walkie-talkies

Special Equipment

* 1	K350 36" wide track front end loader (marshland work)
*14	Mortar pans (marshland work)
1	International boom truck w/winch and boom (marshland work)

Marine Pollution Control (Port Jefferson, NY) 516-473-9132

Booms

*5,000 ft	MPC harbor boom 6" x 12"
2,000 ft	Uniroyal Sealdboom 6" x 12"

Boats

1	65' utility boat
1	60' crew boat
1	40' crew boat
3	56' LCM-6
1	50' LCM
*2	24' workboat
*2	18' outboard workboat
*2	12' aluminum workboat
1	Boston Whaler w/50 hp motor
1	Debris boat (Boatadozer)
1	80' salvage barge w/60 ton crane
1	10,000 gal vacuum barge

Skimmers

*2	Parker weir type (Oil Hawg)
*2	Slurp weir type

Oil/Water Separation Equipment

3	2,500 gal vacuum trucks
1	1,100 gal skid mounted vacuum unit
1	8,200 vacuum truck trailer & tractor

Table 1. Continued

Spill Response Trailers

None

Communication Systems

15 sets	VHF ship-to-shore units in boats and vehicles

Moran-Crowley Environmental Services Company (Carteret, NJ) 201-499-9777

Booms

*5,000 ft	Harbor boom 6" x 12"

Boats

*5	18' aluminum boats
*3	21' workboats

Skimmers

1	33' LPI skimmer
*2	Metropet skimmers

Oil/Water Separation Equipment

1	5,000 gal vacuum truck
2	3,000 gal vacuum trucks
1	3,000 gal stainless steel vacuum truck
7	5,000 gal stainless steel storage tanks

Spill Response Trailers

1	20' Command Port Travel-all

Communication Systems

6 sets	Walkie-talkies (marine band)
1 set	40 channel marine band

New England Pollution Control (Norwalk, CT) 203-853-1990

Booms

*2,000 ft.	Harbor boom 6" x 12"
2,000 ft.	Harbor boom 6" x 18"
*1,000 ft.	Inshore 6" x 6"

Table 1. Continued

Boats

*4	15 and 18' workboats (up to 40 hp)
1	65' work barge

Skimmers

*2	Swiss Oela
*6	Skim Pak
*2	Slick Bar Manta Ray

Oil/Water Separation Equipment

1	6,000 gal vacuum truck
1	3,500 gal vacuum truck
1	3,000 gal vacuum truck

Spill Response Trailers

1	24' Command trailer

Communication Systems

4	Hand-held Motorola (USCG Freq.) & base station

Peabody Clean Industry, Inc. (Perth Amboy) 201-925-6010 and Staten Island 212-729-2121

Booms

*2,200 ft.	Coastal boom 4" x 14"
2,300 ft.	Coastal boom 12" x 24"

Boats

1	16' aluminum whaler 100 hp
2	18' flat bottom boats 25 hp
*1	16' work boat 15 hp
*1	14' work boat

Skimmers

*2	Swiss Oela skimmer
*6	Slurp skimmer
1	Mash 400 skimmer
*3	Parker weir skimmers (Oil Hawg)

Table 1. Continued

Oil/Water Separation Equipment

2	3,000 gal vacuum trucks (straight)
5	6,000 gal vacuum trucks (tractor trailer)
1	4,000 gal vacuum truck
2	3,500 gal vacuum trucks
1	Vactor unit (large material mover)

Spill Response Trailers

1	Mobile Field Office & Communication Center (in Boston)

Communication Systems

10 sets	Walkie-talkies

Table 2. EQUIPMENT RENTAL COSTS

Contractor and Equipment	Rental Costs
<u>Marine Pollution Control</u>	
All Boom	$0.33/ft/day ($1.15/ft cleaning)
Slurp Skimmer	$46.00
Parker Skimmer	$46.00/day
80 ft Salvage Barge w/ 60 ton Crane	$115.00/hour
65 ft Utility Boat	$60.00/hour
60 ft Crewboat	$60.00/hour
40 ft Crewboat	$50.00/hour
56 ft LCM-6	$60.00/hour
50 ft LCM	$60.00/hour
24 ft Workboat	$35.00/hour
18 ft Outboard Workboat	$15.00/hour
12 ft Aluminum Workboat	$85.00/day
Boston Whaler (50 hp)	$15.00/hour
Boatadozer	$35.00/hour
2,500 gal Vacuum Truck	$37.00/hour
1,100 gal Vacuum Unit (skid mount)	$29.00/hour
8,200 gal Vacuum Truck Trailer & Tractor	$51.00/hour
10,000 gal Vacuum Barge	$60.00/hour
<u>Clean Venture</u>	
Boom up to 18 in.	$0.35/ft/day
Boom over 18 in.	$0.40/ft/day
Bennet Mark 6E Skimmer	$260.00/hour
MK 209 Oil Mop	$70.00/hour

Table 2. Concluded

Contractor and Equipment	Rental Costs
Slurp Skimmer	$60.00/day
Swiss Skimmer	$60.00/day
Oil Hawg Skimmer	$300.00/day
Duckbill Skimmer	$60.00/day
30 ft Harbor Tug	$37.00/hour
22 ft Workboat	$28.00/hour
15-19 ft Power Workboats	$150.00/day
Vacuum Trucks (Tractor-Trailer)	$47.50/hour
Vacuum Trucks (Straight Job)	$41.00/hour
Vacuum Unit (Skid Mount)	$27.00/hour
Tractor Trailer w/Pumps	$33.50/hour

Skimmers. Skimmers are the primary means by which oil is recovered from the water surface. They work on a variety of principles with their effectiveness being dependent on the environmental conditions and oil type. Table 4 lists the skimmers available locally and their specifications and capabilities. The majority of skimmers are small, portable units with the remainder being mounted externally or internally to a vessel.

Pumps. Because of the wide variety of pumps available from each contractor, pumps have been listed by type rather than separately. Table 5 lists the pump type with a few manufacturer's names given for each. In general, centrifugal trash pumps are the most common and most widely used in oil spill cleanup with single and double diaphragm pumps also experiencing heavy use. Both are well suited due to their ability to pump heavy oils and pass limited amounts of debris. Even though centrifugal types have a high emulsification potential, this is a secondary consideration and does not affect the capacity of the pump. Other pumps are also well suited for oil spill cleanup but are not widely available. It should be noted, however, that rating pumps by type is not absolute as a few different models or manufacturers of the same pump type may have different capabilities than those listed in Table 6.

Table 3. BOOM CAPABILITIES

Boom	Boom Type	Freeboard	Draft	Max. Wave Height	Max. Current Speed	Stability	Shallow Water Use
Metropolitan Petroleum	Curtain	6 in.	12 in.	1-3 ft	1 kt	Moderate	Good
Metropolitan Petroleum	Curtain	12 in.	24 in.	5 ft	1 kt	Moderate	Limited
Uniroyal Sealdboom	Fence	6 in.	12 in.	1-2 ft	1 kt	Poor	Poor
Coastal	Fence	6 in.	12 in.	1-3 ft	1 kt	Poor	Poor
Coastal	Fence	12 in.	24 in.	1-3 ft	1 kt	Poor	Poor
B.F. Goodrich	Fence	12 in.	24 in.	3-5 ft	1 kt	Good	Poor
Acme	Curtain	6 in.	12 in.	1-3 ft	1 kt	Moderate	Good
Slickbar MK-6	Fence	6 in.	12 in.	1-3 ft	1 kt	Moderate	Poor
American Marine Optimax	Curtain	7 in.	12 in.	1-3 ft	1.5 kt	Good	Good
Kepner Supercompactible Sea Curtain	Curtain	8 in.	12 in.	1-3 ft	1 kt	Moderate	Good
Kepner Supercompactible Sea Curtain	Curtain	12 in.	18 in.	1-3 ft	1 kt	Moderate	Limited
Sea Sentry	Curtain	12 in.	24 in.	1-3 ft	1 kt	Good	Limited

Table 4. SKIMMER CAPABILITIES

Skimmer	Portable or Vessel Mounted	Effectiveness vs. Oil Type Light	Medium	Heavy	Solid	Max. Wave Height	Skimming Speeds[2]	Required Water Depth
JBF 3003	V.M.	High	Moderate to High	Low	Low	2-3 ft	0-3 kts	6 ft
JBF 3001	V.M.	High	Moderate to High	Low	Low	2-3 ft	0-3 kts	4 ft
Bennett Mk 6E	V.M.	High	Moderate	Low	Low	2-3 ft	1-2 kts	6 ft
Oela "Swiss"	P	Moderate to High	Moderate	Low	Not Effective	6"	NA	8"
Slurp	P	Low	Moderate	Moderate	Not Effective	1 ft	NA	1 ft
Oil Hawg	P	Low	Moderate	Moderate to High	Not Effective	6"	NA	6"
Oil Mop	P	High	High	[1]Low to Moderate	Not Effective	6"	NA	6"
Manta Ray	P	Low	Moderate	Low	Not Effective	6"	NA	6"
Acme	P	Low	Moderate	Low	Not Effective	6"	NA	1 ft
Coastal Barge Skimmer	V.M.	Moderate	Moderate	Low	Not Effective	1 ft	1-2 kts	3 ft
______ I-D	V.M.	Moderate	Moderate to High	High	High	2 ft 2-3 ft	0-2 kts 1-4 kts	3 ft 3 ft
LPI	V.M.	Moderate	High	High	Not Effective			
Skim Pak	P	Moderate	Moderate	Low	Not Effective	6"	NA	6"

[1]Effectiveness improved with preheater.
[2]For vessel mounted types only.

Table 5 -- Pump Capabilities

Pump Type	High Viscosity Oils	Small Debris (< ¼")	Moderate Debris (¼-½")	Ice (Small Pieces	Emulsification Potential	Disadvantages
Centrifugal (Monarch, Hale)	Poor	Good	Good	Good	High	Most standard types cannot handle highly viscous oils at all.
Centrifugal--Trash (Homelite, Gorman-Rupp)	Moderate to Good	Good to Excellent	Good to Excellent	Good to Excellent	High	Typically, the higher the debris handling ability of the pump the lower the high viscosity pumping and self-priming ability.
Single Diaphragm (Homelite, Gorman-Rupp)	Good to Excellent	Good*	Moderate* to Good	Good*	Low	High degree of surging from diaphragm action--not applicable for skimmers requiring even suction (Slurp).
Double Diaphragm (Wilden, Sandpiper)	Good to Excellent	Good*	Moderate* to Good	Good*	Low	Slight surging--Many diaphragm pumps are pneumatic requiring a compressor--Diaphragms are susceptible to puncture by debris.
Sliding Shoe (Megator)	Good	Good to Excellent	Good	Good	Moderate	Pump should be operated against a total head of at least 10 ft to seat shoes and maximize efficiency.
Progressive Cavity (Moyno)	Excellent	Good to Excellent**	Good to Excellent**	Good to Excellent	Low	Not designed for mobile field use, may be fixed to deck of barge.
Sliding Vane (Blackmere)	Moderate to Good	Poor	Poor	Poor	Moderate	Cannot tolerate any debris and is ill suited for cold weather.
Rotary Gear (Rotoking)	Good	Poor	Poor	Moderate	High	Can crush small pieces of ice but intolerable to most solid debris.
Hydrodynamic (Spate)	Excellent	Good	Moderate to Good	Good	Moderate	Cannot handle long pieces of debris, i.e., twigs, pencils.

*Some diaphragm pumps claim to handle debris up to 2".

**Depending on model.

Part II - Publicly Owned Oil Spill Containment and Clean-Up Equipment

Nassau County Police Department

1-42' patrol boat
3-32' patrol boats (on duty 24 hrs from April to January; one (1) boat on duty from January to April)
2-27' patrol boats (3 are generally on the North Shore; 3 are on the South Shore)

Nassau County Department of Health

1-23' Mako
2-16' Boston Whalers

Town of Oyster Bay

1-30' Columbia OBH
1-20' Boston Whaler
1-16' Boston Whaler
1-20' Garvey
1-35' Amphibious Landing Craft w/500 gal. container
1-12' Dinghy

Town of Hempstead

1 Ford Van
1 Diesel Scout 4 x 4
1 3500 lb trailer containing 1000ft of containment boom, sorbent sweeps and pads and sorbent boom, and related equipment
6 Various sized vessels for boom deployment

Material Stockpile:

500 ft M-P boom
100 boxes of sorbent pads
200' sorbent boom
400' sorbent sweeps

Town of North Hempstead

1-31' Bertram (with a 150 gpm water pump)
1-18' Boston Whaler
2-300' of Slickbar boom

Suffolk County Police Department

2-37' Egg Harbors
1-31' Chris Craft
4-30' Columbias
2-20' Shamrocks
1-22' Aquasport
1-19' Revenge
3-16' Challengers
3-16' Boston Whalers
1-15' Airgator
3-16' Grummans
1-14' Wolverine

Town of Brookhaven

1-32' Uniflite
2-20' Sealarks
1-19' Garvey
2-19' Shamrocks

Town of Babylon

1-30' Silverton (no winter service)
1-22' Airslot I/O

Town of Huntington

2-23' Patrol Boats
1-26' Work Boat
1-12' Shiff
1 4 x 4 GMC Pick-up
1 6 Wheel Drive Truck and Trailer

Material Stockpile:

300' absorbent sweeps
500 absorbent pads
50' absorbent collars

Town of Islip

In process of equipment inventory

Town of Southampton

1-36' Amphibious Lark
1-30' Dongan III
1-26' Dongan I
1-M/2 Dongan II
1-20' Pro-line (outboard)
1-17' McKee Craft (outboard)
1-16' Bayrunner
1-14' Hampton Whaler
1-14' Garvey
1-14' Grumman
1-14' Duranautic

1-24'x10' Work Barge with Hydraulic Winch

Fire Island National Seashore

Vehicles

3 4 x 4 Cherokee Jeeps
3 4 x 4 Chevy Subarbans
1 4 x 4 Dodge Rack Truck
1 4 x 4 Dodge Club Cab
1 4 x 4 Chevy Pick-Up

Boats

1-32' FINS III Inboard Diesel
1-30' FINS II Inboard Diesel
1-27' FINS IV Inboard Diesel
1-27' Boston Whaler Outrage
3-22' Boston Whalers Revenge
1-21' Stiger Outboard

U.S. Coast Guard, Marine Environmental Protection (MEP) Equipment in New York Area

*indicates equipment available for use in shallow water

Group Rockaway

	1,000 ft	Oil containment boom
*	540'	Sorbent boom (3M type)
*	6 bales	3M sorbent pads
	1 bag	Sorbent pads

Station Rockaway

*	400 ft	Sorbent boom
*	8 bales	3M sorbent pads
	1	44' boat with radar
	2	41' boats with radar
*	1	21' boat with outboard

Station Short Beach

*	400 ft	Oil containment boom (12")
*	8 bales	3M sorbent pads
	1	44' boat with radar
	1	41' boat with radar
*	1	21' boat (stored Nov.-Feb. in shed)
*	1	17' boat (stored Nov.-Feb. in shed)

Station Fire Island

*	100 ft	Sorbent boom (3M)
	6 bales	3M sorbent pads
	1	44' boat with radar (year-round)
	1	41' boat with radar (year-round)
*	1	21' boat (no winter use)
*	1	20' boat (no winter use)

Group New York

*	300 ft	Slickbar harbor boom
*	14 bales	3M sorbent pads
*	23 bales	Sorbent Sweep (100'/bale)
*	4 bags	Oil Snare sorbent
*	1	Slurp skimmer

2 41' boats with radar
5 32' boats without radar
1 30' boat
4 Response vehicles (suburban vans)
1 Command Post (16' trailer)
1 Boom trailer

U.S. Coast Guard Atlantic Strike Team (Elizabeth, NC)

Booms

5,508 ft USCG open water(high seas) boom
*1,000 ft Whittaker harbor boom
*1,000 ft Spilldam harbor boom

Skimmers

1 Lockheed 2004 disc drum skimmer (self-propelled) 1000 gpm
*1 Lockheed disc drum skimmer 50 gpm
*1 Slurp skimmer

Boats

1 22' Boston whaler (v-hull) two 85 hp
1 21' Boston whaler (Tri-hull) two 85 hp
*5 Zodiac boats 35 hp
*3 18' assault boats 25 hp

Other

5 ADAPTS type 1 Emergency Tanker Lightering Systems
1 250,000 gal Dracone barge
2 50,000 gal Dracone barge
1 10,000 gal Dracone barge

Communication Systems

USCG systems - commercial equipment may not be able to interphase easily

Long Island State Parks and Recreation Commission

2-18' Boston Whalers
1 Work Barge with Crane

New York State Department of Transportation

sorbent material stored at Hauppauge
500' Oil Containment Boom - Harbor Type
50' Light Emergency Containment Boom
160' Light Absorbent Boom
4 bales absorbent sheets
2 bales absorbent rolls

Part III - Spill Equipment Owned by Long Island Terminal Association

Carbo-Concord - Contact: Arnold Seltzer/James Grimaldi

(516) 293-2500

400' Optimax boom
12 Bundles 3M sorbent pads, booms and sweeps
1 Pump with 200' suction hose

Commander Oil Co. Inc. - Contact: Joseph G. Shapiro/Leonard Shapiro/
E.J. Barnett

(516) 922-7000
Emergency No. (516) 676-9393/(516) 922-7694

1 13' Boat on trailer/25HP motor
700' Containment boom
100-50 lbs. of absorbant
4 bales (400') Sorbent sweeps (T126)
2 1/2 bales (100') Sorbent booms (T270)
6 1/2 bales(1300') Sorbent sheets (T151)
10 bales 3M Sorbent pads

Glenhead Terminal Corp./Harbor Fuel Co., Inc. - Contact: Donald Death, Jr.

(516) 676-2500
Emergency No. (516) 676-0618

600' Slickbar boom
4 bundles Sorbent pads
1 bundle Sorbent boom
24 bags Oil Absorbent
25-50 40lb. bags Speedi-Dri absorbent

Hawkins Cove Oil Supply Co. - Contact: Bruce Hawkins

(516) 676-7200/759-0227

150' Harbor boom
4 cases Sorbent pads
4 bags Sorbent pellets
10 bags Oil Dry

Reliance Utilities - Contact: Lawrence F. Caputo

(516) 931-6800

Unspecified quantity of Speedi-Dri, Sorbent Pads and Chemical Dispersant.

Lewis - Contact: P. Miglietta

(516) 883-1000/767-2434

800' Boom
20 bags Sorbent pellets
2 bails 3M Sorbent pads
2 boxes Metro Sorbent pads
1 16' Utility Boat 15 HP

Northville Industries Corp.

Riverhead Terminal - Contact: Capt. John Dudley/Zenon Czujko

(516) 727-5600

1 Aluminum Skiff 25 HP
1 Parker Systems Skimmer Mod. 100; Ser. 88 with accessories
1 Floating Power Skimmer with associated equipment
750'x12" Floatation, Oil containment boom
300'x12" Containment boom
1200'x6' Containment boom
100'x8" Sorbent filtering boom
1 Edson Diaphragm pump

In addition the Riverhead terminal has an assortment of Sorbent materials and oil spill response support equipment such as hoses; floats and coils of polyprophylene line.

Plainview Terminal - Contact: Pete Miloski

(516) 349-8071/727-7286

1 Scavenger Pump
30 bags Speedi-Dri

Holtsville Terminal - Contact: Jeff Burns

(516) 475-5060/727-6378

1 Portable pump
60 bags Speedi-Dri

Consolidated Petroleum Terminal (Pt. Jefferson Dock) - Contact: Mr.Vandermark

(516) 941-4040
Emergency No. John Reiff/Walter Remsky (516) 941-4040

1 12' Fiberglass Skimmer Boat 2 HP
1,600' MPL Harbor Oil spill boom
3,000' 3M Sorbent sweep
20 boxes Sorbent pads
6 boxes Sorbent pillows

6 cases Type 300 Oil snare
150' Sorbent blanket
1 Edson pump
1 Lister pump with assorted hoses and equipment

Skaggs-Walsh Inc. - Contact: Peter F. Heaney

(212) 353-7000
Emergency No. Tony Sabatino (516) 389-7247
Bill Michnowitz (516) 352-2571

1 Row boat w/oars
2000 lbs. Sorbent material
55 gals Dispersant
300' Boom
1 Skimmer
200 Sorbent pads

Windsor Fuel Oil Inc. - Contact: D. Leoguande

(516) 746-5900

150' Boom
7 boxes 3M Sorbent pads
1 10' Row Boat
10 Bales Hay

Universal Utilities Inc. - Contact: Joseph Shapiro

(516) 922-7000
Emergency No. E.J. Barnett (516) 922-7694

2 bales (200') Sorbent sweeps (T126)
2 bales (80') Sorbent booms (T270)
3 1/2 bales (750') Sorbent sheets (T151)
600' Containment boom

APPENDIX C

Oily Waste Disposal

The disposal of recovered oil and of oil-contaminated materials can pose immediate and long-range problems. Recovered oil is most easily dealt with by separating out any water that may be present and refining it locally or shipping it to its original destination.

Disposal of contaminated debris is more difficult. Legal requirements for its disposal are established by the New Jersey Department of Environmental Protection for New Jersey and the New York Department of Environmental Conservation or the New York City Department of Sanitation for the New York area. In most cases, contaminated wastes should not be burned. They can be buried safely on land in approved disposal sites if correct procedures are followed. It is often advisable during waste handling, transfer, or storage to cover the area of operation with plastic sheets to prevent contamination.

Disposal can pose several problems. The first is storage and transport of oil and contaminated material to the disposal sites. Remote locations and areas sensitive to vehicular traffic impose limits on access. Helicopters or boats may be necessary to remove pillow tanks and other small storage containers. In the case of a large spill or extended containment or cleanup activities, an access road should be constructed to permit the use of heavy equipment to transport material from the recovery area to the disposal site.

The second problem involves the several available disposal methods. They include oil and water separation, burial, and natural degradation. The specific disposal method selected depends on the nature of the oil-contaminated material, the location of the spill, and the prevailing weather conditions.

Disposal of Recovered Oil

In most spill situations the oil recovered will contain a large percentage of water which should be separated out prior to disposal or recycling. In the event of a major spill, a large-scale oil/water separation operation should be set up at a local refinery, processing plant, or other facility possessing separation equipment. Many authorized waste oil and chemical processing facilities exist throughout New York and New Jersey but are oriented to chemicals and may be limited as to the quantity of material they can handle. Table 1 lists these facilities. A list of the regional liquid waste oil collectors is given in Table 2.

Disposal of Oiled Material

Oil spills can generate large quantities of oil-contaminated material consisting primarily of debris, vegetation, sediments, and sorbenst. Disposal of such debris is a major problem as only a few sites are authorized to receive oily wastes. The disposal regulations for New York and New Jersey are discussed below.

New York. In the State of New York there are presently no predesignated sites approved by the Department of Environmental Conservation (DEC) for disposal of oily wastes. In the event of a spill the DEC will consider requests for disposal on a case-by-case basis. Most landfill operations on Long Island are hesitant to accept oily wastes unless directed to do so by the DEC. There are three lined landfills on Long Island at Brookhaven, Oyster Bay and North Hempstead, which may take oily wastes. The NY DEC would like local communities to accept oily sand and debris collected from their own areas. A form letter sent by the NY DEC to local landfills would request their assistance. The form letter would describe the waste, state its volume, name the waste carrier and state there is no contamination (e.g., heavy metals, PCB's, etc.) in the oil. If contamination is suspected the

Table 1. AUTHORIZED CHEMICAL WASTE PROCESSING FACILITIES* (DISPOSAL/RECYCLING OF LIQUID WASTES)

Facility	Type of Treatment	Type of Waste Accepted
New Jersey		
Advanced Environmental Technology Corp. The Dayton Bldg. 520 Speedwell Ave. Morris Plains, NJ 07950 (210) 539-7111	Transfer, Storage	Packed laboratory chemicals, vegetable oils, motor oils, compressor oils, laboratory chemicals, solvents, pesticides, silver, platinum, gold, copper salts, acids, alkalis, dyes, pigments, solution
AntiPollution Systems, Inc. 350B W. Delilah Rd. Pleasantville, NJ 08232 (609) 641-1119	Incineration	Waste oils, emulsion, water-methanol waste, pigments, dyes
B & L Oil Corp. 472 Frelinghuysen Ave. Newark, NJ 07114 (201) 248-7925	Reprocesser	Crankcase oil, fuel oil, hydraulic oil
Browning Ferris Industries 714 Division St. Elizabeth, NJ 07207 (201) 352-2222	Transfer, Storage	Flammable solids, paint, pigment, ink sludge, oil, solvent, slurries, flammable liquids, non-flammable liquids
Clark Systems Formerly Blackwood Carbon Products Little Gloucester Rd. Blackwood, NJ (906) 589-7301	Oil Recovery	Oil and oil emulsions
Duane Marine 26 Washington St. Perth Amboy, N.J. (201) 925-6010	Oil/water separation and reprocessing. Storage facility.	Oil and oil emulsions.
Earthline Co. 100 Lister Ave. Newark, NJ 07105 (201) 465-9100	Organic reclamation, from contaminated aqueous waste, acid/base neutralization, hazardous waste detoxification (oxidation reduction), fuel reclamation	Organic, aqueous wastes, solvents, chlorinated solvents, oily wastes, acids, alkalis, cyanides, mixed heavy metal waste, waste fuel and lubricating oils

Table 1. Continued

Facility	Type of Treatment	Type of Waste Accepted
Eastcoast Pollution Control, Inc. Cenco Blvd., P.O. Box 275 Clayton, NJ 08312 (906) 881-5100	Transfer, Storage	Cleanup debris, waste oil, mixed solvents, still bottoms
Elco Solvent Corp. 30 Amor Avenue Carlstadt, NJ 07072 (601) 460-4000	Transfer, Storage	Flammable, non-flammable liquids, solvents
Inland Chemical Corp. 600 Doremus Ave. Newark, NJ (201) 589-4085	Reclamation, Recovery	Solvents, organic liquids, aqueous-organic emulsions, lacquer, paint, pigment residues
Kit Enterprises Inc. 475 Division St. Elizabeth, NJ 07201 (201) 574-8804	Reclamation, Recovery, Blending, Treatment	Oil lubricants, fats and fatty oils, heavy and light hydrocarbons
L & L Oil Service Inc. 740 Lloyd Rd. Aberdeen, NJ 07747 (201) 566-2785	Transfer, Storage, Reprocesser, Blending	Waste oil and oil sludge
Lionetti Waste Oil Service Inc. 9 Line Rd. Holmdel, NJ 07733 (201) 946-2505	Storage, Blending	Motor oils, fuel oils, hydraulic oils
Marisol Incorporated 125 Factory Lane Middlesex, NJ 08846 (201) 469-5100	Transfer, Storage, Reprocesser, Reclamation, Recovery, Blending, Treatment	Oils, emulsions, solvents, flammable organic liquids, non-flammable liquids, paint, pigment residues, flammable liquids
Modern Transportation 75 Jacobus Ave. Kearny, NJ 07032 (201) 589-0277	Transfer, Storage, Reclamation, Recovery, Treatment, Disposal	Oils, emulsions, acid, alkali solutions, wastewaters, acids alkalis

Table 1. Continued

Facility	Type of Treatment	Type of Waste Accepted
Oil Recovery Co. Inc Cenco Blvd. P.O. Box 345 Clayton, NJ 08312 (609) 881-7400	Storage, Reprocesser, Reclamation, Recovery, Blending	Waste oil, solvents, oil sludge
Rollins Environmental Services P.O. Box 221 Bridgeport, NJ 08014 (609) 467-3100	Incineration, Neutralization, Chemical Treatment, Recovery, Reclamation, Transfer, Storage	Sludges, contaminated residues, spill debris, process wastewater, slurries, tank cleanings, solvents
S & W Waste, Inc. 25 Delmar Rd. Jersey City, NJ (201) 344-4004	Transfer, Storage	Paint, dyes, pigment residues, heavy metal residues, flammable solids, oils, emulsions, flammable liquids, acids, alkalis, solvents
Safety-Kleen Corp. Almo Industrial Park Clayton, NJ 08312 (609) 881-2526	Reclamation, Recovery	Oil, oil emulsions, oil sludges, mixed solvents
Standard Tank Cleaning Co. 184 Hobart Avenue Bayonne, NJ 07002 (201) 339-5222	Recovery, Storage	Oils, emulsions, organic sludges, non-flammable liquids, flammable liquids
New York		
Chemical Waste Disposal Corp. 42-19 19th Ave. Astoria, NY (212) 274-3339	Processing/Treatment Recycling/Reclamation Distillation for oil recovery	Sludges, paint, oil, lab chemicals, plating waste, chlorinated solvents
Frontier Chemical Waste Process, Inc. 4626 Royal Avenue Niagara Falls, NY 14303 (716) 285-8200	Processing/Treatment Recycling/Reclamation	Waste oil/industrial waste, reusable chemicals, nonchlorinated oil, burnable liquid wastes, recovered methanol, recovered oil, chlorinated solvents
Haz-O-Waste Corp. Canal Road Wampsville, NY (315) 682-2160	Processing/Treatment Recycling/Reclamation Distillation	Solvents, waste oil, burnable, liquid wastes, acids, alkalis, sludges

Table 1. Concluded

Facility	Type of Treatment	Type of Waste Accepted
NEWCO Chemical Waste Systems, Inc. 4626 Royal Ave. Niagara Falls, NY 14303 (716) 278-1811	Processing/Treatment Recycling/Reclamation	Hazardous/toxic wastes and most every other waste stream except radioactive and shock-sensitive explosives
SCA Chemical Waste Services, Inc. 1550 Balmer Rd. Model City, NY 14107 (716) 754-8231	Processing/Treatment Recycling/Reclamation Secure landfill	Solvents, acid, heavy metal sludge, paint wastes, PCB solids and sludges, contaminated soil, organic liquids

Sources: New Jersey Department of Environmental Protection and New York Department of Environmental Conservation

*Check authorization status with the New York D.E.C. (212) 488-3862 or the New Jersey D.E.P. (609) 292-5560 prior to use.

Table 2. APPROVED WASTE OIL COLLECTORS (LIQUID HAULING)

Name and Address of Firm	No. of Trucks
New York	
Ace Waste Oil, 71-34 58th Avenue, Maspeth, NY 11378	
Akba Waste Oil, 3836 Hahn Ave., Bethpage, NY 11714	
A-Z Waste Service, Inc. 60 Harmon St., Falconer, NY 14733	9
Albany Waste Oil Corp., RD #2, Clifton Park, NY 12065	2
Alboro Construction Co., 90-48 Corona Ave., Elmhurst NY 13209	1
Allied Chemical Corp., P.O. Box 6, Milton Ave., Solvay, NY 13209	6
Allied Waste Corp., 88-13 204 St., Hollis, NY 11423	3
American Chemical Disposal Corp., Oser Ave., Hauppauge, NY 11778	
Buckner Waste Oil Service, 21 Stonecrest Dr., New Windsor, NY 12550	1
Certified Waste Oil, 320 Court House Rd., Franklin Square, NY 11010	
C & F Pollution Control, Inc., 3266 Taylor St., Schenectady, NY 12306	4
Chamberlain's Septic Service, 1835 Route 104, Union Hill, NY 14563	6
Chemical Management, Inc., 340 Eastern Parkway, Farmingdale, NY 11735	
Chemical Waste Disposal Corp., 42-14 19th Avenue, Astoria, NY 11105	2
C.H. Heist Corp., 505 Fillmore St., Tonawanda, NY 14150	5
Coastal Pollution Control Services, Inc., P.O. Box 140, Renesselaer, NY 12144	4
Cortlandt's Septic Tank Service, Inc., P.O. Box 351, 22 Albany Post Rd., Mentrose, NY 10548	6

Table 2. Continued

Name and Address of Firm	No. of Trucks
County Tank Lines, Inc., Rte. 58 - E. Main Street, Riverhead, NY 11901	
County Waste Oil, Inc., 57 Brown Place, Harrison, NY 10528	3
Domermuth Petroleum Equipment and Maintenance Corp., Box 62, Clarksville, NY 12041	6
Duane Marine Corp., P.O. Box 435, Staten Island, NY 10308	
East Coast Tank Lining Corp., 700 Hicks St., Brooklyn NY 11231	3
Elmwood Tank Cleaning Corp., 62 West Market St., Buffalo, NY 14204	5
Environmental Oil, Inc., P.O. Box 315, Syracuse, NY 13209	5
E.W. Wilsworth and Sons Sanitation Service, 219 Mitchell Ave., Mattydale, NY 13211	2
Fourth Coast Pollution Control, La Grasse St., Waddington, NY 13694	3
Frank Masone, Inc., 368 Ocean Ave., Lynbrook, NY 11563	4
Frank's Bay City Oil Service, 1117 Olympia Rd., No. Bellmore, NY 11710	
Frontier Chemical Waste, 4626 Royal Avenue, Niagra Falls, NY 14303	3
General Electric Co., P.O. Box 8, Room 2C13 K-1, Schenectady, NY 12301	1
General Waste Oil Co., 37 Longworth Ave., Dix Hills NY 11746	
Harrison Radiator Div. GMC, Upper Mountain Rd., Lockport, NY 14094	3
Industrial Oil Tank and Line Cleaning Service Co., 307 East Garden St., Rome, NY 13440	4
Inland Pollution Control Inc., P.O. Box 357, 63 Columbia St., Rensselaer, NY 12144	2

Table 2. Continued

Name and Address of Firm	No. of Trucks
J.B. Waste Oil Co., 18-18 41st St., Long Island City, NY 11105	
James Parks, 2734 Chestnut St., York, NY 14592	1
Janic Waste Oil Corp., Bay Street, Freeport, NY 11520	
J.K. Waste Oil Service, 280 Grank Blvd., Deer Park, NY 11729	2
J.W. Lenza Oil Company, 3 Court St., Staten Island, NY 10304	1
Kroll Associates, 19 Woodgate Rd., Tonawanda, NY 14150	RENTAL
Loeffel's Oil Service, RD #2, Narrowburg, NY 12764	3
Lomasney Combustion, Inc., 366 Mill St., Poughkeepsie, NY 12602	2
Long's Landscaping, 2106 Love Rd., Grand Island, NY 14072	1
Luzon Oil Company, P.O. Box 19, Hurleyville, NY 12747	2
Manhattan Oil Service, 21-11A 46th St., Astoria, NY 11105	1
Marine Pollution Control, Inc., 460 Terryville Rd., Port Jefferson Station, NY 11776	4
New Era Oil Service, Inc., 402 Parsons Drive, Syracuse, NY 13219	5
Niagra Mohawk Power Corp., 300 Erie Blvd., West Syracuse, NY 13202	2
Niagra Tank and Pump Co., 262 Carlton St., Buffalo, NY 14204	1
Oceanside Equipment Rental Corp., 70 New St., Oceanside, NY 11572	3
Oldover Corp., P.O. Box 2, Saugertiers, NY 12477	1
Patterson Chemical Co. Inc., 102 Third St., Brooklyn, NY 11231	
RGM Liquid Waste Removal, 972 Nicols Rd., Deer Park, NY 11729	

Table 2. Continued

Name and Address of Firm	No. of Trucks
Rice Tank Cleaning Corp., 434 Suffolk Ave., Box 296, Central Islip, NY 11722	7
Wm. F. Sheridan, Jr. Industrial Oil Corp., 114 Peconic Ave., Medford, NY 11763	
Southgate Oil Services, Inc., P.O. Box A, 2699 Transit Rd., Elma, NY 14059	9
Stage Construction Co., Inc., 105 Commercial Ave., Vestal, NY 13850	2
Strebel's Laundry, 644 Montauk Highway, Westhampton, NY	
Superior Pipecleaning, Inc., 168 Woodlawn Ave., Woodlawn, NY 14219	5
Swanson Chemical Laboratories, Inc., 4 West First St., Lakewood, NY 14750	1
Timber Lake Campground, Plato Maples Rd., RFD #1, Box 72, E St., Otto, NY 14729	1
United Pump and Tank of Rochester, Inc., 779 Arnett Blvd., Rochester, NY 14619	1
Verdi Construction, Route 31, Savannah, NY 13146	6
Wizard Method, Inc., 1100 Connecting Rd., Niagra Falls, NY 14304	14
W.L. Oil Co., Inc., 178 North Elting Corners Rd., Highland, NY 12528	2
W.M. Spiegel Sons, Inc., 461 E. Clinton St., Elmira, NY 14902	7
World Wide Pollution Control, Inc., P.O. Box 702 New Station, New Paltz, NY 12561	3
<u>New Jersey</u>	
A.M. Environmental Services, Inc., 1031 Market St., Paterson, NJ 07513	7
Angus Tank Cleaning Corp., One Ingham Ave., Bayonne, NJ 07002	6

Table 2. Continued

Name and Address of Firm	No. of Trucks
Clean Venture, Inc., P.O. Box 418, Foot of South Wood Ave., Linden, NJ 07036	1
Depalma Oil Co., 21 Myrtle Ave., Jersey City, NJ 07305	4
Eastcoast Pollution Control, Inc., Cenco Blvd., Clayton, NY 08312	12
Energall, Inc., 411 Wilson Ave., Newark, NJ 07105	18
Essential Trucking Corp., Fanny Rd., Boonton, NJ 07005	3
Kisko Transportation Co., Inc., 504 Raritan St., Sayerville, NJ 08872	1
Loeffel's Waste Oil Service, Inc., P.O. Box 651, Old Bridge, NJ 08857	3
Marisol, Inc., 125 Factory Lane, Middlesex, NJ 08846	4
Nalco Chemical Co., 1927 Nolte Drive, Paulsboro, NJ 08066	1
Ned's Waste Oil Service, P.O. Box 375, Newton, NJ 07860	4
Phil's Waste Oil, 13 Ronald Drive, E. Hanover, NJ 07936	1
Robert More Waste Oil, 124 Baltimore St., North Arlington, NJ 07032	1
SCA Chemical Services, Earthline Division, 100 Lister Ave., Newark, NJ 07105	47
Solvents Recovery Service of New Jersey, Inc., 1200 Sylvan St., Linden, NJ 07036	2
T/A Samson Tank Cleaning, 101 E. 21st St., Bayonne, NJ 07002	3
<u>Other</u>	
Acme Services, Inc., 985 Plainfield St., Johnston, RI 02919	7
Berks Associates, Inc., P.O. Box 305, Douglassville, PA 19518	4

Table 2. Concluded

Name and Address of Firm	No. of Trucks
Colvin's Waste Oil Service, 24 Marrer St., Warren, PA 16365	1
G & H Oil Co., 455 Hemlock Rd., Warren, PA 16365	1
Hitchcock Industrial Liquid Waste, 40 California St., Bridgeport, CT 06608	5
Jet Line Services, Inc., 441R Canton St., Stoughton, MA 02072	18
New England Marine Contractors, Inc., 189 Lakeside Ave., Burlington, VT 05401	6
New England Pollution Control Co., Inc., 7 Edgewater Pl, E. Norfolk, CT 06855	6
Schofield Oil Ltd., P.O. Box 40, Breslau, Ontario, Canada NOB 1MO	3
Solvents Recovery Service of New England, Inc., Lazy Lane, Southington, CT 06489	6
The Crago Co., Inc., Route 26, P.O. Box 409, Gray, ME 04039	3
Tansenvironmental Corp., 500 Ford Blvd., Hamilton, OH 45011	1
Tricil Limited, 602 Rte. 132, Ste. Catherine, Quebec, Canada	1

NY DEC would analyze the contents. This plan is still in the fromative stages.

New York City. All requests for information relative to disposal of oil-contaminated solid wastes shall be channeled through the NYC Department of Sanitation, Operations Control Office, Bureau of Waste Disposal at the following numbers:

(212) 566-5326/5327

The following locations have been designated for receipt of oil-contaminated solid waste generated during and as a result of oil spill cleanup operations. Use of the following disposal facilities will be limited to those carriers possessing a "NYS DEC Industrial Waste Collector Certificat of Registration" (SW-3) and either a Department of Consumer Affairs Waste Conveyance License or a Department of Sanitation Construction Waste Permit. Disposal of materials will be from 0800 to 1600, Sundays and holidays excluded.

NYC Disposal Sites - Fountain Avenue Landfill
Fountain Ave. & Belt Parkway
Brooklyn, N.Y.

Edgemere Landfill
Beach 49th St. & Beach Channel Dr.
Rockaway, Queens, N.Y.

Brookfield Avenue Landfill
Arthur Kill Rd. & Brookfield Ave.
Staten Island, N.Y.

A list of qualified and approved regional oily solid waste carriers is given in Table 3.

If further information be required, Mr. Gus Fischetti, Engineer in Charge of Landfills, should be contacted, (212) 272-9811.

New Jersey. For disposal of oil-contaminated solid wastes within the State of New Jersey, contact the New Jersey Department of Environmental Protection for an approved dump site at (609) 292-5560. There are currently no

Table 3. APPROVED OILY WASTE CARRIERS (SOLID WASTE BUILDING)

Active Oil Service, Inc. 374 Main Street Belleville, NJ 07109 (201) 482-4600	National Oil Recovery Corp. Hook Road & Commerce Street Bayonne, NJ 07002 (201) 437-7300
Atlantic B.C., Inc. 145 Van Dyke Street Brooklyn, NY 11231 (212) 522-3260	Newtown Refinery Corp. 37-80 Review Avenue Long Island City, NY 11101 (212) 729-7660
Chemical Control Corp. 23 South Front Street Elizabeth, NJ 07202 (201) 351-5460	Oceanside Equipment Rental Corp. 70 New Street Oceanside, NY 11572 (516) 678-4466
Earth Line, Inc. End of Wood Avenue Linden, NJ 07036 (201) 862-4747	Oil Tank Cleaning Corp. 107-127 27th Street Brooklyn, NY 11232 (212) 499-9608
East Coast Tank Lining Co. 700 Hicks Street Brooklyn, NY 11231 (212) 855-7272	Petroleum Tank Cleaners, Inc. 145 Huntington Street Brooklyn, NY 11231 (212) 624-4842
Guardino & Sons, Inc. 80 Broad Street New York, NY 10004 (212) 943-6966	Royal Tank Cleaning Corp. 687 S. Columbia Avenue Mount Vernon, NY 10550 (914) 664-7070
Mobil Oil Corp. 4165 Arthur Kill Road Staten Island, NY 10307 (212) 948-5400	Samson Tank Cleaning Corp. 101 East 21st Street Bayonne, NJ 07002 (201) 437-1044
Modern Transportation Co. 75 Jacobus Avenue S. Kearney, NJ 07032 (201) 589-0277	Standard Tank Cleaning Corp. One Ingham Avenue Bayonne, NY 07002 (201) 339-5222

approved dump sites in New Jersey. Approval for dumping oil-contaminated solid wastes is granted on a case-by-case basis.

All vehicles used in the collection or haulage of solid waste shall properly and conspicuously display the New Jersey Solid Waste Administration (NJSWA) registration number in letters and numbers at least 3 inches in height, and shall carry the current Solid Waste Administration registration certificate in the vehicle. In addition, in letters and numbers at least 3 inches in height, the capacity of the vehicle in cubic yards or in gallons, with the appropriate unit designated, shall be marked on both sides of the vehicle so as to be visible to the operator of the solid waste facility.

Further, all vehicles containing oil-contaminated waste shall be conspicuously placarded by the special waste hauler. Such placarding shall meet the requirements of the United States Department of Transportation for the transport of hazardous materials (49 CFR 170 et seq.).

No special waste facility shall accept oil-contaminated waste unless the vehicle is properly placarded in accordance with this section.

Temporary Waste Storage. If there are large quantities of materials for disposal, a temporary storage site should be established. A temporary storage site provides a location to store oily sediment and debris removed during shoreline cleanup operations until a final disposal site has been located, approved, and made operable. The temporary storage sites should be located in areas with good access to the shoreline cleanup operation and to nearby streets and highways. Good storage site locations are flat areas such as parking lots (paved or unpaved) or undeveloped lots adjacent to the shoreline.

Temporary storage sites should be selected and prepared to minimize contamination of surrounding areas from leaching oil. Therefore, storage sites should not be located on or adjacent to ravines, gullies, streams, or the sides of hills, but on flat areas with a minimum of slope. Once a location is selected, certain site preparations are usually necessary to contain any leaching oil. An earth berm should be constructed around the perimeter of the storage site. If a paved parking lot is used, earth would have to be imported from nearby areas; if an unpaved surface is used, material can be excavated from the site itself and pushed to the perimeter thereby forming a small basin. Entrance and exit ramps should be constructed over the berm to allow cleanup equipment access to the site. If the substrate or berm material is permeable, plastic liners should be spread over the berms and across the floor of the storage site in order to contain any possible oil leachate.

A front-end loader should be stationed at each storage site to evenly distribute the dumped oily material and to load trucks removing the material to final disposal.

APPENDIX D

Dispersants

Introduction

Spills of crude oil and petroleum products in the marine environment can result in varying types and degrees of environmental damage. In some cases spills may even involve threat of fire and explosion. To reduce these threats, various specialized techniques and equipment have been developed and used with different degrees of success. In almost all cases, limitation of spread and physical recovery of the spilled material represent the most environmentally acceptable actions and should always be given first consideration. However, as a result of spill size, weather, and other factors, control and recovery are not always adequate or even possible. Other options to minimize impacts should be explored in these situations.

An alternative to conventional methods of containment and recovery is the use of chemical dispersants. Dependant on the oil characteristics dispersants can assist the breakup and mixing of oil slicks into the water column, accelerating dilution and degradation rates. In addition, they may be used in sea states where conventional techniques are no longer effective.

Federal Regulation

The use of chemical dispersants is closely regulated by the federal government and can only be initiated in situations where it is deemed the most effective and least environmentally hazardous alternative. While advocating physical control and removal of spilled oil, the National Oil and

Hazardous Substances Pollution Contingency Plan provides the basis for case-by-case utilization of chemical dispersants and other treating agents. Known as Annex X, this schedule permits consideration of chemical dispersion in the following circumstances (40 CFR 1510, Annex X, Sections 2003.1-1 to 2003.1-1.3):

- In any case when, in the judgement of the federal On-Scene Coordinator (OSC), their use will prevent or substantially reduce hazard to human life or limb or substantially reduce explosion or fire hazard to property.
- For major or medium discharges when, in the judgement of the on-scene Environmental Protection Agency representative, their use will prevent or reduce substantial hazard to a major segment of the population(s) of vulnerable species of waterfowl.
- For major and medium discharges when, in the judgement of the Environmental Protection Agency response team member in consultation with appropriate state and federal agencies, their use will result in the least overall environmental damage, or interference with designated water uses.

Principals of Dispersion

Dispersion may be defined as the act or state of being broken apart and scattered. Oil floating on water will ultimately disperse naturally in response to currents and waves. As the degree of surface energy increases, the rate of natural dispersion increases. Typically, however, the natural process is slow and agitation of some oils often results in the formation of extremely persistent and difficult to treat water-in-oil emulsions (tar balls, mousse). For some oil types dispersants can greatly increase the rate of dispersion and prevent the formation of water-in-oil emulsions reducing the potential damage associated with floating slicks.

Dispersant formulations contain varying amounts of surface active agents (or surfactants). Technically, surfactants act to modify (reduce) the oil surface tension. Each surfactant molecule may be thought of as polar in nature, one end having an affinity for oil, and the other an affinity for water. When applied to floating oil, the surfactant diffuses through the oil and individual surfactant molecules orientate themselves along the surface with their water attracting ends out. (It is critical that the dispersant contact the oil and not be applied to the surrounding water.) As the slick is broken apart by natural or manmade energy, treated particles are separated and repelled, preventing slick reformation. Eventually, treated oil particles are broken into small enough drops that they remain suspended and dispersed in the water. Because the oil particles are surrounded by surfactant molecules, they tend not to adhere to solid objects such as boats, shorelines, etc. In dispersed form, the spilled oil has a much larger surface area which serves to accelerate solution, evaporation, photo-oxidation, and biodegradation rates.

Environmental Effects

The acceptance of chemical dispersants as a means of combatting oil spills has been deterred by real and inferred environmental damages associated with a few misapplications of early high toxicity products and a limited knowledge of the potential effects of the modern, low toxicity dispersant formulations.

However, there has been little evidence from actual field use of dispersants to prove or disprove significant effects resulting from the proper application of chemical agents. In contrast, the ecologic realities associated with spilled oil - particularly in coastal and shoreline areas - are dramatic and far better understood. When predictable damage or threats associated with untreated oil are compared with the known and unknown aspects of chemically treated oil, it may be possible to identify cases in which one action has significantly less total risk than another.

Toxicity data on government accepted dispersants are available from the EPA in the form of LC_{50}'s. Using the effective dosage rates, the potential concentrations of dispersants in the water column can be estimated and compared to their LC_{50} values. The comparison can then be used to predict possible ecologic consequences.

Some laboratory and field evidence suggests that chemically produced oil dispersions may be more toxic than naturally produced dispersions. It has been hypothesized that this phenomenon is a synergism between oil and dispersant which produces more toxic end products. Certain toxic components in the oil are activated, and therefore, preferential release of other toxic components occurs. A dispersant can increase the rate at which volatile fractions of oil are available to enter the water column. It is generally believed, however, that the "increased toxicity" of a dispersion is more related to the increased availability of the oil to various marine organisms. By breaking the oil up into minute droplets, the dispersant enhances the uptake and incorporation of certain oil components by many marine organisms through their breathing and feeding mechanisms. For this reason, dispersed oil at a given concentration may have a more adverse impact on a biological amenity than untreated oil at the same concentration.

Undispersed oil in nearshore areas and on shorelines can smother organisms and plants and cause extensive physical and aesthetic impacts. Undispersed oil is difficult and expensive to clean up because it typically adheres to shoreline surfaces.

Use

There are three basic types of modern dispersants: water-base, solvent-base, and concentrate. They differ mainly in the nature of their carrier

Table B-1. DISPERSANT APPLICATION EQUIPMENT AND TECHNIQUES

Type of Equipment	Application Technique	Dispersant Type
Hand-operated garden sprayer	Manual application from vessel or dock	Premixed solvent base, water base or concentrate
Portable pump and hand-carried spray nozzle	Manual application from vessel or dock	Premixed solvent base or concentrate
Spray boom and low pressure pump	Direct application from vessel at sea; agitation with breaker boards	Premixed solvent base
Spray boom, high pressure pump and eductor or metering pump	Direct application from vessel at sea: agitation with breaker boards, water streams or propwash optional	Concentrate or water base diluted on-board with sea water
Fire monitor/hose, high pressure pump, and eductor or metering pump	Direct application from vessel at sea or from dock: agitation optional	Concentrate or water base dilluted on-board or dock-side with sea water
Helicopter with spray booms	Aerial application: agitation from wind and waves	Undiluted concentrates
Light aircraft with crop dusting apparatus	Aerial application: agitation from wind and waves	Undiluted concentrates
Heavy aircraft with spray booms	Aerial application: agitation from wind and waves	Undiluted concentrates

medium and the ease with which dispersions are formed. Dispersion using water-base formulations typically requires more time and energy. Because they use water as a solvent, these products can be diluted on-site with seawater, thus lending themselves to vessel application. Solvent-base formulations tend to disperse more easily, but are generally more toxic and require higher dosage rates. They are ineffectual when diluted with water. Concentrates contain high percentages of surface active agents. Depending on the product, they may be used neat, diluted with seawater, and/or diluted with hydrocarbon solvents. The "self-mixing" type of concentrate requires extremely low levels of mixing energy. By virtue of their versatility, dispersant concentrates lend themselves to most methods of application.

Dispersant use is greatly affected by the type of oil. Rapidly spreading oils are more easily dispersed than heavy or slowly spreading oils. Solvent base dispersants were formulated primarily for use on heavy or paraffinic oils as they are harder to break down. Chemical dispersion of highly weathered oils or water-in-oil emulsions is typically very difficult, if not impossible.

Application Techniques and Equipment

There are three basic techniques used to apply dispersants to floating oil; each has its own variety of application equipment. The three application techniques are: manual, vessel and aerial. The actual equipment and technique used depends on the type of dispersant to be applied, and the size and location of the spill. Table B-1 lists the type of equipment needed for the various dispersing agents and application techniques.

Manual Application. Manual application is typically limited to use in very small spills or confined areas. The equipment consists of three-to-five-gallon garden sprayers, usually the backpack type, or portable pumps with hand-carried nozzle sprayers. Equipment should be fitted with nozzles producing a coarse spray for applying dispersants. Manual application is usually done from the shoreline, a dock or pier, and can also be done from small boats.

Vessel Application. Basically, there are three types of vessel mounted application systems: bow spray, Warren Spring Laboratory (WSL) - type, and high-pressure jet spray. The bow spray and WSL systems both use booms fitted with spray nozzles to apply the dispersants. The nozzles produce coarse flat sprays which overlap slightly at the water surface. The bow spray system has the booms mounted near the vessel bow. With the WSL system, booms are positioned slightly aft of midship. The WSL system also incorporates breaker boards towed behind the spray booms to provide external mixing energy. Bow wakes and propellor wash from several small boats and high-pressure water streams from fire fighting equipment can also be used to supply energy.

The third system uses fire fighting monitors or hand-held nozzles to apply dispersants. The high-pressure streams are directed in an arc up over the slick or played back and forth across the oil. In most cases the vessel's own salt-water fire fighting system is used.

These systems are used primarily to apply water-base or concentrated dispersants in heavily diluted solutions. The systems operate by drawing water from the sea and supplying it to the booms or monitors at high pressures and volumes (100 psi and 100-250 gpm respectively). The dispersant is introduced into the mainstream of water using an eductor or metering pump at a rate which produces the desired concentration.

Also available is a WSL low pressure volume system for applying hydrocarbon-base dispersants. In this case the agent is supplied directly to the booms with no dilution.

Aerial Application. Three types of aircraft have been used in aerial application of dispersants: helicopters, light, and heavy fixed-wing aircraft. Suitable aircraft typically come fitted with agricultural or fire fighting spray systems which require only minor modification for dispersant use. The spray systems are usually supplied with misting or atomizing nozzles which must be replaced with ones producing a coarse spray.

Two types of spray systems are available for use with helicopters. One is the on-board type which has the spray booms, tanks, and motor fitted directly to the helicopter. The other system has a single unit consisting of the booms, tank and pump, which is slung underneath the helicopter. The advantage of this system is that it can be hooked up in a matter of minutes to almost any available helicopter.

Dosage

Dosage required for effective dispersion will vary with each spill situation. Most manufacturers supply or can provide dosage recommendations with their products. Subject to regulatory approval, these recommendations can be used as a starting point for dosage determination. The optimum dosage (number of gallons of dispersant applied per acre of slick), is primarily governed by the slick thickness. Generally, the amount of dispersant required is directly proportional to the thickness, and therefore the volume of oil per acre. Under normal conditions the recommended dosage for most dispersants is 5 to 10 gallons per acre for an average slick thickness of 0.5 to 2.0 mm. By trial application, dosage should be adjusted to achieve the desired result at the minimum application rate.

APPENDIX E

Filter Fence/Sorbent Barrier

Permeable barriers constructed onsite and made of wire screen or mesh and sorbents can be used to contain or exclude oil from interior areas such as marsh channels and mosquito ditches. Permeable barriers offer the advantages of noninterference with flow, conformance with bottom configuration, and response to tidal variation. Because of flow reverses in tidal areas, double barriers are required. A diagram of a typical permeable barrier is shown in Figure A-1. While a variety of screen and mesh fencing is available, heavier materials are recommended. When subjected to high currents and debris, lighter material such as chicken wire will probably fail.

Single-sided permeable barriers may be constructed in small streams or channels having continual water flow in one direction. In this case a single line of posts is driven into the stream bottom with the screen fastened to the upstream side. Sorbent is also placed on the upstream side of the barrier only, relying on the current to hold it in place.

The screen height in both cases must be sufficient to prevent sorbent from going over the top at high tide and under the bottom at low tide. The screen mesh size must be compatible with the type and size of the sorbent used.

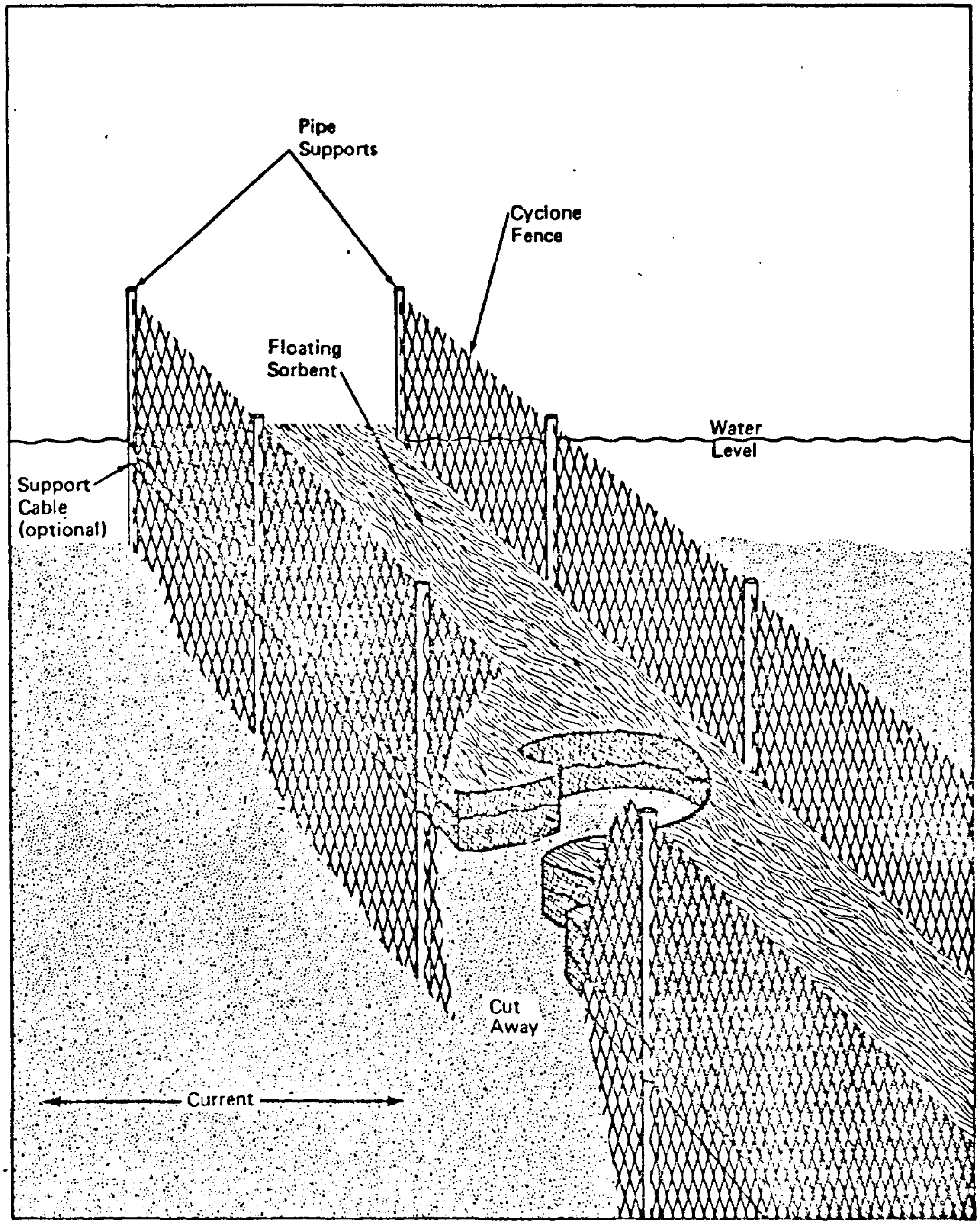

Figure 1. TYPICAL PERMEABLE BARRIER